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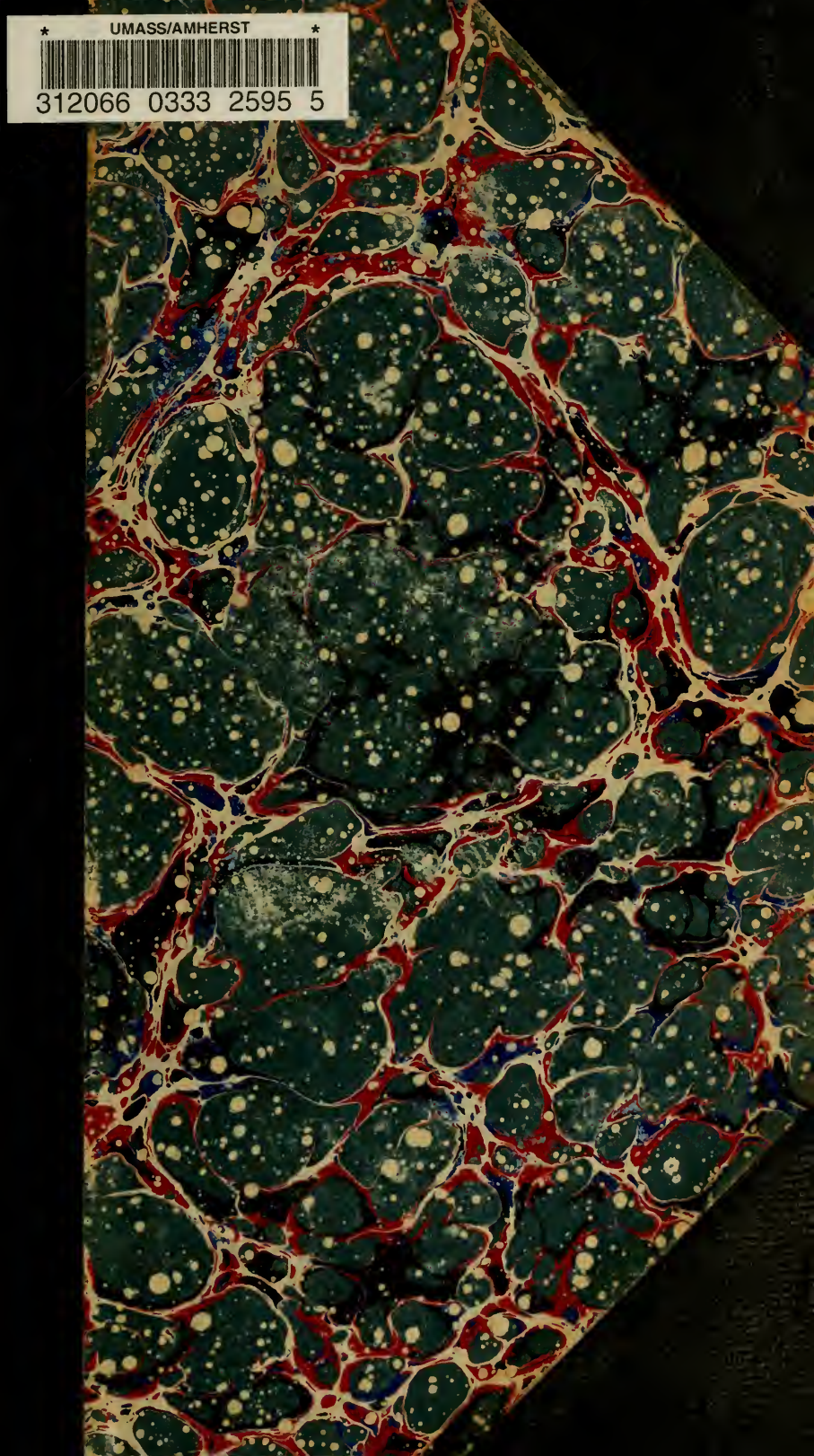

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SERIES OF 1902. BULLETIN NO. 1.

MASSACHUSETTS

CROP REPORT

FOR THE

MONTH OF MAY, 1902.

ISSUED BY

J. W. STOCKWELL,

SECRETARY STATE BOARD OF AGRICULTURE.

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Crop Report for the Month of May, 1902.

Office of State Board of Agriculture,
Boston, Mass., June 2, 1902.

Bulletin No. 1, Crop Report for the month of May, our first monthly crop bulletin for the current season, is herewith presented. While there will be no radical changes in the method and scope of these bulletins, we shall endeavor to make such improvements in their general form and subject matter as may seem practicable, and shall welcome any suggestions to that end from our readers. An article on some timely subject by some writer of acknowledged authority in agricultural matters will be included in each issue, as heretofore. This bulletin contains an article on "Cucumber growing in Massachusetts," by George E. Stone, Ph.D., professor of botany at the Massachusetts Agricultural College, to which we would respectfully call the attention of our readers.

Progress of the Season.

The May returns of the United States Department of Agriculture (Crop Reporter for May, 1902) show the area under winter wheat in cultivation on May 1 to have been about 27,103,000 acres. This is 4,868,000 acres, or 15.2 per cent, less than the area sown last fall. For the area remaining under cultivation the average condition was 83.4, as compared with 85.4 on May 1 of last year, 88.9 in 1900, and 83.2, the mean of the averages of the last ten years.

The average condition of winter rye on May 1 was 83.4, as compared with 85.4 on April 1, 94.6 on May 1 of last year, 88.5 in 1900, and 89, the mean of the May averages of the last ten years.

The average condition of meadow mowing lands was 86.6, against 92.8 on May 1 of last year, 90.8 in 1900, and 90.6, the mean of the May averages of the last ten years.

The average condition of spring pastures was 84.9, against

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91.5 on May of last year, 91.3 in 1900, and 90.1, the mean of the May averages of the last ten years.

Of the total amount of spring plowing contemplated, it is estimated that 72.3 per cent was actually done up to May 1, against 67 per cent at the corresponding date last year and a ten-year average of 71.1 per cent.

Weather Summary, Jan. 1 to May 1, 1902.

[Furnished by the Weather Bureau, Boston.]

The weather during January was uneventful and unusually pleasant for the midwinter season. There was much sunshine and precipitation in measurable amounts on an average of 8 days. The precipitation was below the average in all sections, although it was quite well distributed. The chief feature in connection with this element was the snowfall, which was far below the average for this month. The average for the State was 8.5 inches, which is several inches below the usual amount for January; but, owing to the uniformly low temperature, the mean of which was 1.5 below the normal of the month, the ground was well covered with snow, giving good sleighing most of the period. The temperature conditions were very favorable to ice interests, and the weather generally adapted to out-door industries.

The weather of February was of the type usually experienced during this month. There were several storms of marked intensity, accompanied by general and heavy precipitation, with high winds and gales. The most conspicuous of these occurred on the 2d and 17th. The rain and attending high temperature caused a rapid melting of the snow on the ground, and the result was swollen rivers and streams. Fortunately, the depth of the snow was not great and the damages from high water not great or general. The monthly precipitation was nearly 2 inches above the normal. The temperature ranged near the seasonal average, without notable features in the extremes.

March was generally unseasonable, some of the weather elements departing greatly from the monthly average. The most important departures were in the temperature and the precipitation. The monthly mean of the former was 8° above the normal, and in some localities the excess amounted

to 10°. The excess in precipitation was less marked, although general in all sections. The snowfall, as in the preceding month was light. At the close of the month the season was, according to the general estimate, from ten days to three weeks in advance of the average.

Generally speaking, April was a pleasant month. The weather was mild, with the temperature above the average, the excess amounting to about 2°. There was less than the customary amount of sunshine, and by many the month was considered damp and gloomy. Notwithstanding the extensive cloudiness, rain fell on an average of but 9 days. The monthly precipitation was somewhat above the normal, the amounts ranging from 1 to 2½ inches. There was no snowfall worthy of mention, the amounts being generally too small to measure. Thunderstorms were of general occurrence on the 26th and 30th. The month closed with the season in advance of the normal, variously estimated from ten days to a fortnight.

Temperature and Rainfall for the Whole Country.

[From United States Climate and Crop Bulletins.]

Week ending May 5. — The week was much warmer than usual in the districts east of the Rocky Mountains, with the exception of the upper Missouri valley, where it was slightly cooler than the average. Over the western portion of the Plateau regions and on the Pacific coast the week was cooler than usual, being decidedly cool over the interior of northern California, Nevada, and portions of Idaho, Oregon and Washington. Abundant rains fell over the greater part of the upper Mississippi valley and Lake region, including parts of the Ohio, lower Missouri and Red River of the North valleys, and in the interior and northern portions of the Middle Atlantic States. Over a large part of the central Gulf States the week was practically rainless, and less than the usual amount fell over most of the central and upper portions of the Missouri valley.

Week ending May 12. — The week averaged decidedly cool from the upper Missouri valley eastward to the New England coast, and was slightly cooler than usual in the upper Ohio valley, over the northern portion of the Middle

Atlantic States and Texas. Elsewhere the week was warmer than usual. Freezing temperatures occurred in the central and northern Rocky Mountain districts, and from northern Minnesota eastward to the New England coast. Over a considerable portion of the upper Lake region, upper Mississippi and Red River of the North valleys, the weekly rainfall amounted to more than 1 inch. Very little rain fell in the central Gulf States, Ohio valley, portions of the central Mississippi valley, lower Lake region, New England, and over much of the Middle and South Atlantic States, there being no appreciable amount over a considerable area extending from southern New England to Maryland.

Week ending May 19. — Throughout the eastern Rocky Mountain slope, central valleys, southern States, upper Lake region, and over the greater part of the Middle Atlantic coast districts, the week averaged warmer than usual, being decidedly warm in the Missouri, central Mississippi and lower Ohio valleys. The week averaged cooler than usual over portions of the lower Lake region, in northern New England, over the western portion of the Plateau region and on the Pacific coast. Very heavy rains fell over an area extending from Louisiana and eastern Texas northward to the Dakotas, and also over portions of the upper Mississippi valley and east Gulf States. The week was dry throughout New England and Middle Atlantic States, in Florida, southern Texas, Tennessee, in the Ohio, central Mississippi, and lower Missouri valleys, and over the northern portion of the upper Lake region.

Week ending May 26. — The week was cooler than usual in the Rocky Mountain and Pacific coast districts, except over a small area on the north Pacific coast, where the temperature was about normal. Eastward of the Rocky Mountains the week was warmer than the average, the temperature excess ranging from 3 to 6 on the coast and from 6 to 12 throughout the central valleys. A large part of the southern States received no appreciable amount of rain during the week. There was also less than the weekly average over portions of the central Missouri valley and middle and southeastern Rocky Mountain districts. Over the interior portions of New England and the Middle Atlantic States and gen-

erally throughout the Lake region, Ohio, upper Mississippi and lower Missouri valleys, the rainfall was very heavy, the greater part of these districts receiving more than 1 inch.

Special Telegraphic Reports.

[Weather Bureau, Boston.]

Week ending May 5. — New England. Boston: Sunshine deficient; rain excessive north, and, while retarding planting in all sections, was favorable to growing crops in south portion; grass excellent; tobacco and garden crops in good condition, but making slow growth; fruit prospects very promising.

Week ending May 12. — New England. Boston: Weather favorable for work, but too cool for growth; general frost, 10th, damaged garden vegetables and probably injured fruit; tobacco plants in good condition and nearly ready for transplanting; forest fires damaged some cranberry bogs; grass excellent; good progress with planting.

Week ending May 19. — New England. Boston: Weather favorable for farm work, but too cool for crop growth; nights exceptionally cool; frost in many sections, probably damaged fruit to a considerable extent; crops in fairly satisfactory condition; season about average; rain needed.

Week ending May 26. — New England. Boston: Cool first part of the week, with frost in north; latter part of week warm; ground dry; grass suffering for rain; crops fairly satisfactory, with normal growth; apples promising except Baldwins, which have not bloomed well; other fruits good.

The Weather of May, 1902.

The month opened with an excess of cloudiness, and the rainfall above the average. The rainfall for the first week averaged somewhat more than an inch. Owing to the small amount of sunshine and the general dampness, the weather seemed cool, although the average temperature was several degrees in excess of the seasonal. The second week presented some extremes in temperature, the weekly average being fully up to, and in some instances above, the normal, while the minima were near or below freezing. A cool wave occurred on the 10th and 11th, and caused very general

frosts, which, owing to the high winds, were not destructive, except in some instances to garden truck. The precipitation during this period was below the average, and in some sections there was none at all. The weather conditions remained rather abnormal through the third week, the nights especially being notably cool, with light frosts in many sections. There was, however, an abundance of sunshine and a corresponding deficiency in the amount of rainfall. The dry weather caused complaint in some sections, and there was a need of rain for growing crops, for a suitable cultivation of the soil and for planting seeds. The droughty conditions were largely due to high and dry westerly winds and the rapid evaporation caused by the same, rather than to a long absence of rain. The season is still considered several days in advance of the average. The weather during the closing week of the month was without special or unusual features. While there was still a deficiency in the rainfall, there were local showers which were of much benefit, and which broke the "dry spell" to a large extent. The nights were cool for the first part of this period, but these were followed by some warm days, the temperature on the 23d rising to almost unparalleled figures for the season. Generally speaking, the weather was characteristic of the month.

In the circular to correspondents, returnable May 23, the following questions were asked: —

1. How does the present season compare, agriculturally speaking, with a normal season?

2. What is the promise for pastures and mowings, and did fall seeding winter well?

3. How did the fruit bloom compare with the bloom of former years, and has it suffered from late frosts?

4. What insects appear to be doing the most damage in your locality?

5. To what extent is spraying practised against insects attacking fruit, and is it on the increase in your locality?

6. Is farm help scarce, or plenty; and what proportion can be called good help?

7. What are the average wages paid farm help in your vicinity, with board? Without board?

8. Will there be any marked change in the acreage of the usual farm crops, and do you note any new enterprises in the line of agriculture?

Returns have been received from 167 correspondents, and from them the following summary has been made up: —

The Season.

The season opened early, and at the beginning of the month was considerably in advance of the normal. The cold, dry weather during the first two decades of the month operated to retard plant growth, and at the time of making returns the season was probably about normal in most sections. Light frosts were frequent during the month, but no great amount of damage resulted. Owing to the large proportion of fair days, farm work is somewhat farther advanced than usual. The fruit bloom appears to have been several days in advance of the normal in all sections.

Pastures and Mowings.

At the time of making returns, pastures and mowings were suffering from the effects of a dry May, feed being reported as already short in pastures in some instances, and the prospect for a good hay crop not flattering. Since that time abundant showers have fallen in most sections, affording at least temporary relief. With sufficient rainfall in the future, pastures should do well, but it is doubtful whether the hay crop entirely recovers from the check it has received. More complaints were received than usual of fall seeding being winter-killed, and, on the whole, it has not wintered as well as usual, probably largely owing to the open winter.

Fruit Bloom.

Seldom has a heavier general fruit bloom been reported than this season's. The only exceptions to the rule appear to be pears and Baldwin apples, some complaints of a light bloom of these having been received. The frosts of the month did but little damage to fruit, although there are a few complaints of damage to the peach bloom, and the earliest strawberry blossoms were nipped in many sections, making it probable that the crop will be late. Berries of all kinds bloomed well.

Insects.

Tent caterpillars appear to be more plentiful than for some years, but have as yet done no serious damage, and with a little foresight and work may be easily controlled. Other insects mentioned are current worms, cut worms, potato bugs, elm-leaf beetles, horn flies, white grubs, plant lice, canker worms, asparagus beetles and brown-tail and gypsy moths. There were very few reports of damage by canker worms.

Spraying.

There does not appear to be any particular increase in the practice of spraying, in fact, several correspondents report that it is decreasing rather than increasing. As this is likely to be a good fruit year, those farmers producing a surplus of fruit over that required for home use will do well to spray with both insecticides and fungicides, as the effect will be great on both the quantity and quality of the product.

Farm Help and Wages.

There seems to be a fair supply of good farm help, although the supply of strictly first-class help is, of course, less than the demand. Judging from our reports, there is more and more good help to be had each year. The scale of wages seems to be rising, judging from the reports, and $20 per month now seems a fair average with board. Without board $35 per month would appear a fair average, although there is little help employed in this way. For day work $1.50 per day is now the sum most often mentioned, while a few years ago it was $1.25.

Acreage of Farm Crops.

Owing to the high prices of grain during the past winter, there will be a considerable increase in the acreage of corn and a lesser one in that of other grains. A slight increase in the acreage of potatoes is also indicated. Other farm crops will about maintain their customary areas. Something will be done in a small way in the Connecticut valley in growing tobacco under cloth, but this is the only strictly new enterprise noted.

NOTES OF CORRESPONDENTS.

(Returned to us May 23.)

BERKSHIRE COUNTY.

Sheffield (D. R. Andrews). — The present season is a full average one. Pastures and mowings promise very well, and fall seeding is looking well. The fruit bloom was a full average one, but has suffered more or less from frost. Tent caterpillars are doing some damage. Spraying is not much practised, but is on the increase. Help is scarce, and one in ten is good help. Wages average from $18 to $20 per month with board, and from $30 to $35 per month without board. There will be more corn raised than in former years.

Otis (S. H. Norton). — The season is backward, owing to cold, frosty weather. Pastures and mowings are very backward. There is a full average fruit bloom. No damage from insects is to be noticed as yet. Spraying is not practised in this section. Farm help is very scarce. Wages average $18 to $20 per month with board, and from $1.25 to $1.50 per day without board. I notice no special changes in the usual line of farming.

Tyringham (E. H. Slater). — The season is somewhat backward. Pastures and mowings are suffering for want of rain. The fruit bloom is not as good as usual, and has suffered some from late frosts. Very little spraying is done in this section. Farm help is very scarce, and only a small portion of it is good. Wages average $20 per month with board, and $1.50 per day without board. There will be more corn raised than usual.

West Stockbridge (Wm. C. Spaulding). — The season is about as early as usual; cold, frosty nights, days fair. Meadows and pastures look well, but much need rain; fall seeding did fairly well. Some fruit trees show a lighter bloom than last year, and frost caught early blooms to some extent. Tent caterpillars and currant worms have made their appearance. Spraying is not practised hereabouts. There seems to be help enough, but not over half of it is good help. Wages average from $1 to $1.25 per day

with board, and $1.50 per day without board. There are no noticeable changes in the acreage of the usual farm crops.

Washington (E. H. Eames). — The season is two or three weeks late; pastures and mowings are very backward. The fruit bloom is later than last year, and suffered somewhat from frosts. Insects have done no damage as yet. Spraying is not practised in this locality. Help of all kinds is scarce, and good help cannot be found. Wages average from $15 to $20 per month with board. The acreage of the usual farm crops is the same as in former years.

Richmond (T. B. Salmon). — The season is somewhat later than usual, with cold, frosty nights. Pastures are short and mowings are backward. There is about an average fruit bloom, but it has been injured by late frosts. Tent caterpillars are doing some damage. Spraying is not much practised. Farm help is scarce, and one-half is what might be called good help. Wages average $20 per month with board, and $1.50 per day without board. There will be no marked changes in the acreage of farm crops.

Lanesborough (Scott Jenks). — The season is a fair one, aside from being a little backward. Pastures and mowings look well, and have heard no complaint about fall seeding. The fruit bloom was a good one, and the frosts did little damage. Codling moths and potato bugs have done some damage. Spraying is but little practised against insects attacking fruit. Farm help is very scarce, and it is a hard matter to hire good, trusty farm help; good men prefer to work at other occupations. Wages average $20 per month with board, and $1.50 per day without board. There will be about the usual acreage of the ordinary farm crops.

Cheshire (L. J. Northup). — The season compares favorably with a normal season. Pastures and mowings are looking fair; fall seeding looks well. Fruit bloom is 50 per cent above last year, and was not injured by late frosts, not being forward enough at the time. Spraying is not practised very much about here. Farm help is scarce, but probably 25 per cent of it is good help. Wages range from $15 to $22 per month with board, and from $25 to $35 per month without board. I think the acreage of corn and potatoes will be increased somewhat.

Williamstown (S. A. Hickox). — The season compares well with an average season. Pastures and mowings are nearly up to the average, and fall seeding wintered well. Potato bugs are doing some damage. Spraying is coming into vogue, but not extensively as yet; those who do spray speak favorably of it.

Farm help is scarce, and about one-fourth of it is good help. Wages average $18 per month with board, and from $25 to $35 per month without board. There will be no marked changes in the acreage of the usual farm crops, and no new enterprises in agriculture.

FRANKLIN COUNTY.

Rowe (J. F. Brown). — The season is at present far better than the normal. Fall seeding wintered well, and pastures and mowings are looking finely. Fruit trees have bloomed full, and have not suffered from frosts. Spraying is but little practised, and is not increasing. Farm help is scarce, and about one-fourth of it is good help. Wages are from $1 to $1.25 per day with board, and from $1.25 to $1.50 without board. There are no marked changes in the acreage of farm crops, and no new enterprises in agriculture.

Hawley (C. C. Fuller). — The season is better than the normal at the present time. Pastures and mowings promise well, and fall seeding wintered well. The fruit bloom was above the average, and was not injured by late frosts. Tent caterpillars are doing some damage. Spraying is not practised at all. Farm help is scarce, but nine-tenths of that available is good help. Wages average $20 per month with board, and $1.50 per day without board. The acreage of corn will be increased.

Colrain (A. A. Smith). — The season compares well with the normal. Pastures and mowings promise well, and fall seeding wintered well. Spraying is not practised to any great extent. Farm help is scarce, and there is but very little good help. Wages average $20 per month with board, and $30 per month without board. There will be an increase in the acreage of the usual farm crops.

Ashfield (Charles Howes). — The spring has been a good one for farm work, but cold and backward. Pastures and mowings are not looking very encouraging, but fall seeding wintered well. Fruit trees are blooming full, and do not show damage from frost. Tent caterpillars are the worst insect pest as yet. Spraying is practised to a limited extent, but does not increase much. Farm help is scarce, but is mostly native, and good help. Wages average $1.25 per day with board, and $1.50 per day without board. The high price of grain is stimulating farmers to raise more corn for grain and for the silo.

Deerfield (Charles Jones). — The season is about an average one. Pastures are dry, and the hay crop will be light unless we have rain soon. Fall seeding wintered very well. Not much

spraying is done, and it is not on the increase. Farm help is scarce, and about one-half of it is fairly good. Wages average about $20 per month with board, and $30 without board. The acreage of onions and tobacco will be slightly increased, while that of potatoes and corn will remain about the same. Tobacco plants are looking very well, but are a little late.

Sunderland (J. M. J. Legate). — The season is late and unfavorable for all crops except grass. Pastures and all grass lands are looking finely, and fall seeding wintered well. There is fully an average fruit bloom, and it did not suffer from frosts, with the exception of the first blooms on strawberries, which were killed. A few tent caterpillars are the only insects that have appeared. There is no spraying done here. Farm help is said to be scarce, but it is generally good. Wages average $20 per month with board, and $1.50 per day without board. There is an increase in the acreage of onions and tobacco, and a few acres of tobacco will be raised under cloth.

Wendell (N. D. Plumb). — The season is very backward. Fall seeding is looking well, but pastures and mowings are suffering from lack of rain. Fruit of all kinds is in full bloom, and has not suffered from frosts. But little spraying is done here. Farm help and help of all kinds is very scarce, but about three-fourths of it can be called good. Wages range from $20 to $25 per month with board, and from $1.50 to $1.75 per day without board. There will be a very large acreage of potatoes planted, compared to other years.

Northfield (T. R. Callender). — While plowing began earlier than usual, cold weather has continued up to the present time, making the season late. Pastures and mowings need rain; fall seeding wintered finely. Apples and peaches made an unusually good bloom, but suffered from frost in some localities. Tent caterpillars are the only insect doing damage. Very little spraying is done, and there is no noticeable increase. Farm help is very scarce, and only a small proportion of it is good. Wages average $21 per month with board; day help from $1.50 to $1.75. More corn and potatoes will be planted than for a number of years. Prices for cucumbers at factory have advanced, but there will be no material increase in the acreage. About the usual acreage of sweet corn will be grown for the canning factory at Brattleboro, Vt.

Warwick (Samuel Hastings). — The season is about a normal one, agriculturally speaking. Pastures, mowing and fall seeding are looking well. The fruit bloom was about an average one, but

peaches and small fruits suffered somewhat from frosts. The practice of spraying is on the increase. Farm help is scarce. Wages range from $20 to $26 per month with board, and average $1.50 per day without board. More corn will be planted than ordinarily.

HAMPSHIRE COUNTY.

Greenwich (Wm. S. Douglas). — The season is about a normal one. Pastures and mowings are backward, but fall seeding wintered well. The fruit bloom was much heavier than last year, but has suffered somewhat from late frosts. Tent caterpillars are doing some damage. Spraying is not much practised. Farm help is scarce. Wages average $25 per month with board, and $1.50 per day without board. There will be no marked change in the acreage of the usual farm crops.

Prescott (W. F. Wendermuth). — The season is ten days late, with frequent late frosts, and the season's work is also ten days behind the normal. Fall seeding wintered fairly well, but pastures are in need of rain. There was a large fruit bloom, but early varieties have suffered from frost in some places. Tent caterpillars are the only insects doing damage. No spraying is done. Farm help is scarce, but is mostly good. Wages range from $20 to $25 per month with board, an average $1.50 per day without board. The acreage of corn will be increased about 25 per cent. Several of our abandoned farms have been sold during the past year, and will be occupied by real farmers this year.

Amherst (Wm. P. Brooks). — The season's work is exceptionally forward, but the nights during May and many of the days have been cool, so that rain and warm weather are needed for growth of crops. Mowings and pastures look well, but need rain soon; fall seeding wintered well. Peaches, plums and apples made a very full bloom; pears and cherries uneven; tree fruits have not suffered from frost, but the early bloom of strawberries was generally killed. Tent caterpillars are the only insect doing damage Spraying is generally practised by growers who are in fruit as a specialty, but not much by others, and is not increasing much. Wages range from $12 to $18 per month with board for ordinary farm help, and from $18 to $25 for first-class help; without board, first-class men command from $35 to $40, others from $5 to $10 less. The acreage of onions, corn and tobacco will be increased, and a little tobacco will be grown under cloth.

Granby (G. A. Blish). — The season is a good fair one so far. Pastures and mowings look fairly well, but need rain now; fall seeding wintered well. There was a full fruit bloom, but it suffered

quite a little from frost. Cut worms and tent caterpillars are doing some damage. Spraying is not much practised, and is increasing very slowly. Farm help is scarce, and there is very little good help. Wages average from $20 to $25 per month with board. There will be no marked changes in the acreage of the usual farm crops.

Hatfield (Thaddeus Graves). — The season has been cold, dry and windy, with frequent frosts. Pastures and mowings are in need of rain. There has been a fine fruit bloom, and it has apparently not suffered from late frosts. There is no spraying, or nearly none. Farm help is scarce, and very little of it is good help. Wages range from $20 to $30 per month with board, and from $35 to $45 without board. The acreage of farm crops will be about the same as usual.

Williamsburg (F. C. Richards). — The season is about an average one. The grass crop promises to be light, but fall seeding wintered well. There has been a heavy fruit bloom, with no injury from frost. Tent caterpillars are doing some damage. Spraying is not practised to any great extent, and is not increasing. Farm help is scarce, and the proportion of good help is very small. Wages range from $18 to $22 per month with board, and average about $30 per month without board. There will be an increased acreage of corn, potatoes and tobacco.

Southampton (C. B. Lyman). — The season is about an average one. Pastures and mowings look poorly, on account of cold, dry weather; fall seeding wintered well. The fruit bloom was rather better than an average one. Tent caterpillars are doing some damage. Spraying is but very little practised. Farm help is scarce, and about one-half of it is good help. Wages average from $18 to $20 per month with board, and $1.50 per day without board. There will be very little change in the acreage of the usual farm crops.

Cummington (S. W. Clark). — The season was early in April; May has been cold and dry; season normal at this date. Pastures and mowings are somewhat winter killed, and need rain; fall seeding did not winter very well. The fruit bloom was about normal, but the frost of May 10 did some damage. But few practise spraying, and it is not on the increase. Farm help was very scarce early in the season, but is more plentiful now; all help good. Wages average from $15 to $20 per month with board, and from $1 to $1.25 per day without board. There are no changes in the acreage of farm crops worth reporting.

Middlefield (J. T. Bryan). — The season is a little earlier than

the normal, but has been too dry. Pastures are in fair shape, but new seeding looks very poorly. There was a full fruit bloom, with no damage from frost. Very little spraying is done. Help is very scarce, and much of it is inferior. Wages average $20 per month with board, and $1.50 per day without board. The acreage of corn will be much increased, perhaps 50 per cent.

HAMPDEN COUNTY.

Blandford (E. W. Boise). — The season about a normal one at the present time. Pastures are becoming short, and meadows are growing up thin, on account of lack of rain. All fruits are one mass of bloom, and have not been injured by frosts. Tent caterpillars are quite plenty, and more spraying will be done than usual. Farm help is very scarce, and not over one-fourth of it is good help. Wages average from $20 to $25 per month and $1.25 to $1.50 per day with board, and from $35 to $40 per month and $1.50 to $1.75 per day without board. Much more corn than usual will be planted, and much land brought under the plow that is in need of being cropped.

Russell (E. D. Parks). — The season is about as forward as usual, but is very dry in this section. The promise for pastures and mowings is very poor at present. Tent caterpillars and currant worms are doing some damage. Spraying is but very little practised. Farm help is very scarce, and there is but little good help. Wages average $1 per day with board, and $1.50 per day without board. There will be no marked changes in the acreage of farm crops.

Westfield (C. F. Fowler). — The season opened early, but there has been but little warm, growing weather. Grass starts very slowly, as the ground is cold, and there is prospect of a short crop. Fruit trees bloomed full and a week earlier than usual, and show no signs of injury from frost. Tent caterpillars are very plentiful. Spraying must soon be the universal practice, if we are to have fruit. Farm help is scarce, and good, trusty help not to be had. Wages average from $20 to $22 per month with board, and $1.50 per day without board. There will be a larger acreage of potatoes and corn; other crops about as usual.

West Springfield (T. A. Rogers). — The season is about normal, but rain is needed. Pastures and mowings started well, but the frost of the 10th checked growth; fall seeding wintered well. Apples made a full bloom; pears, peaches and plums a partial bloom; quinces full. Tent caterpillars are quite plentiful, and horn flies are annoying cattle somewhat. Farm help is not plenty,

but is generally good. Wages average $25 per month with board, and $1.50 per day without board. There will be some increase in the acreage of corn and tobacco.

Wilbraham (E. C. Clark). — The season is rather late. Pastures and mowings promise well; fall seeding winter-killed on low land. There has been a heavy fruit bloom, and no injury from frost. Very few spray their fruit trees, but some will do so this year for the first time. Tent caterpillars are doing some damage. Farm help is scarce, and not over one-third is good help. Wages average $20 per month with board, and $35 per month without board. The acreage of farm crops will be about the same as in former years, except that of corn, which is increased one-half.

Palmer (O. P. Allen). — The season compares favorably with the normal. Pastures and mowings promise quite well, and fall seeding wintered well. The fruit bloom was unusually full, and does not seem to have suffered much from frosts. Tent caterpillars are doing some damage. Farm help is rather scarce, and about one-fourth of it is good help. Wages average about $18 per month with board, and about $1.50 per day without board. There seems to be no marked departure from the usual farm methods.

WORCESTER COUNTY.

Warren (Wm. E. Patrick). — The season is more forward than usual in many respects, but is retarded at the present time by lack of rain, and cold nights. Pastures are backward, but mowings promise well; fall seeding wintered in good shape. The fruit bloom is much above the average, and was not affected by frost. Tent caterpillars are doing some damage, but nothing very serious. There is but little spraying done, but it is on the increase. Farm help is scarce, and possibly one-fourth may be called good help. Wages average $20 per month with board, and $1.50 per day without board. There will be an increased acreage of corn, and possibly of potatoes.

Brookfield (F. E. Prouty). — The season is about an average one. Pastures are early, but need rain; fall seeding wintered well. The fruit bloom is heavy, and has not been injured by frost. Tent caterpillars are doing some damage. Spraying is but little practised, and is not increasing. Farm help is quite plenty. Wages average $20 per month with board, and $1.25 to $1.50 per day without board. The acreage of potatoes and corn will be increased.

New Braintree (C. D. Sage). — The season is a fair one at present. The promise for pastures and mowings is not good unless

we have more rain soon. All fruit trees have bloomed very full. Tent caterpillars are doing some damage. Very little if any spraying will be done. Farm help is always scarce. Wages range from $18 to $28 per month with board, and from $35 to $38 per month without board. There will be very little change in the acreage of farm crops.

Dana (E. A. Albee). — The season is about a normal one. Pastures and mowings are 25 per cent. below the average in condition, and fall seeding winter-killed badly. There was a full fruit bloom, but it has suffered from frost. Tent caterpillars are doing some damage. There is no spraying done in this locality. Farm help is scarce, with about one-half of it good help. Wages average $25 per month with board, and $1.50 per day without board. There will be no marked changes in the acreage of the usual farm crop.

Templeton (Lucien Gove). — Warm weather came earlier than usual, but at the present time the season is no farther advanced than the average. Mowings are in good condition, but pastures are backward because of lack of rain; fall seeding wintered well. The fruit bloom was no more than a fair average, Baldwin apples uneven; injury from frost is reported in a few localities. Tent caterpillars are doing some damage. There is but a limited amount of spraying done, and its increase is slow. Farm help is more difficult to secure every year, and about one-fourth of it may be classed as fair. Wages range from $16 to $30 per month with board, and from $1.50 to $1.75 per day without board. There will be no change in the acreage of farm crops, unless it be in an increased amount of corn.

Royalston (C. A. Stimson). — The season is about a normal one. Pastures and mowing promise well, but fall seeding suffered a 10 per cent damage from winter-killing. There was a full fruit bloom, and no damage of any account from frost. Very little spraying is done, and there is no increase in the practice. Farm help is scarce, and about one-fourth of it good. Wages average $20 per month with board, and $35 per month without board. More corn will be planted than usual.

Ashburnham (E. D. Gibson). — Pastures and mowings are not as good as usual at this date. There was a very full fruit bloom; plums were somewhat injured by frost. White grubs are doing some damage. There is but little spraying done, but many speak of the necessity for it. Good help is scarce, not one in four being classed as good. Wages average from $17 to $20 per month with board, and $1.50 per day without board. There will be a large

increase in the acreage of corn grown for grain, and some increase in that of grain crops.

Fitchburg (Jabez Fisher). — The fruit bloom is from six to eight days earlier than the average for forty-six years. Pastures and mowings promise very well if sufficient rain falls, which is now lacking. The fruit bloom is quite variable, in some cases a full bloom, in others quite small, especially Baldwin apples; very little damage from frosts. A few tent caterpillars are doing damage. A few spray regularly and systematically, but it is mostly neglected. Farm help is scarce, both good and poor. Wages average $1.50 per day without board. There are no changes of note in the acreage of farm crops.

Sterling (H. F. Sawyer). — Trees seem more forward than usual at this time. Grass will be light if we do not have more rain soon; fall seeding was much injured; very little feed in pastures. The fruit bloom was up to the average except for Baldwin apples, which made a light bloom; no damage from frost except perhaps on very low ground. Potato bugs are doing some damage. Spraying is but little practised. Farm help is very scarce, and not more than one-fourth of it is good help. Wages average $18 per month with board. The acreage of corn and potatoes will be increased, and cow peas and soy beans are being raised more extensively.

Southborough (E. F. Collins). — Everything considered, the season is about an average one. Pastures start slowly; mowings where fertilized look very nicely; fall seeding wintered well. Peaches bloomed very full, but apples only made about half an average bloom. Tent caterpillars are quite numerous. There is not as much spraying as formerly, for canker worms only. Help is rather scarce, but fairly good where well paid. Wages range from $20 to $30 per month with board. The acreage of farm crops will be about the same as usual, with a little more corn grown.

Oxford (D. M. Howe). — The season is an average one, agriculturally speaking. Pastures and mowings promise well, and fall seeding wintered well. There was a full fruit bloom, and no particular damage from frost. I can learn of no spraying in prospect. Farm help is scarce, and very little of it is good help. Wages average from $18 to $20 per month with board, and from $30 to $35 per month without board. There will be no marked changes in the acreage of the usual farm crops.

Mendon (J. J. Nutter). — The season is about a normal one. Pastures and mowings are not as promising as last year. The prospect for fruit is the same as two years ago, with no damage from frost. Spraying is not practised to any extent. Tent cater-

pillars are doing some damage. Farm help is somewhat scarce, and but a very small proportion can be called good help. Wages average about $20 per month with board. More field corn has been planted than usual.

MIDDLESEX COUNTY.

Hopkinton (W. V. Thompson). — The season is a little earlier than last year. Pastures and mowings are in good condition, and fall seeding wintered well. Apples and peaches made a full bloom; pears none. Tent caterpillars are doing some damage. Very few spray. Farm help is scarce and poor; most of our help is hired by the day and hour. There are no marked changes in the acreage of the usual farm crops.

Sudbury (E. W. Goodnow). — Agriculturally speaking, the present season is above the average. Pastures and mowings look well, and fall seeding is doing fairly well. The fruit bloom is above the average, and has not suffered from late frosts. Caterpillars are the only insects that have done much damage as yet. Spraying is practised but very little, and seems to be decreasing rather than increasing. Farm help is very scarce, and the greater part of it is very poor. Wages average from $20 to $25 per month with board, and from $35 to $40 without board. There will be no marked changes in the acreage of the usual farm crops.

Stow (G. W. Bradley). — The season is about two weeks later than last year. Rain is needed to bring the grass along; some fall seeding was partly winter-killed. There was about an average fruit bloom, but peaches and plums were injured by frosts. Tent caterpillars have appeared, and some brown-tail moths are reported in a few places. But very few spray, and the practice is decreasing, if anything. Farm help is scarce, and about one-fourth of it is good help. Wages range from $12 to $20 per month with board, and from $1.50 to $2 per day without board. More corn will be planted this year than usual, on account of more silos being built.

Townsend (G. A. Wilder). — The season is about a normal one. Pastures and mowings promise well, and fall seeding wintered well. The fruit bloom is light on late apples, small fruits about average, peaches good; some injury from frosts. Tent caterpillars are doing some damage. Very little spraying is done. Farm help is scarce, and about half of it is good help. Wages average from $15 to $20 per month with board, and from $1.25 to $1.50 per day without board. There are no marked changes in the acreage of the usual farm crops.

Groton (J. P. Fitch). — The season is earlier than usual, but is otherwise about normal. Pastures and mowings are in fair condition, but there was too little snow during the winter for fall seeding to winter well. There was a fair fruit bloom, and it has not suffered from late frosts. Elm-leaf beetles are doing some damage. Spraying is on the increase. The supply of farm help meets the demand, and 60 per cent of it is good help. Wages average $25 per month with board, and $40 per month without board. There will be no marked changes in the acreage of farm crops.

Billerica (Geo. P. Greenwood). — The season is very promising. Pastures poor; mowings good; fall seeding wintered well. Baldwin apples made a 60 per cent bloom; early apples better; peaches full; pears light. Tent caterpillars are doing some damage. One-fourth of our fruit trees are sprayed, and the practice is increasing. Farm help is scarce, and one-third of it is good help. Wages average $20 per month with board, and $33 per month without board. More field corn will be planted than usual.

Lincoln (C. S. Wheeler). — The season is perhaps a little earlier than usual. Pastures and mowings are in good condition, but more rain is needed; fall seeding fairly good. Apples and peaches made very full blooms; some damage to strawberries by frost. Perhaps 2 per cent of our fruit trees are sprayed, but the practice is increasing slowly. Farm help is not plenty, and not over 40 per cent of it is good help. Wages average from $20 to $23 per month with board, and from $1.50 to $1.75 without board. There will be no marked changes in the acreage of the usual farm crops.

Woburn (W. H. Bartlett). — The season is about an average one, although the cold, dry weather has retarded plant growth. Frost has not injured the fruit bloom in this section, and it is looking well. Tent caterpillars and brown-tail moths are doing some damage. Spraying is practised somewhat, but not as much as it should be. Farm help is very scarce, and day help is almost impossible to get. Wages are $1.50 per day without board when we can get help. The acreage and kind of farm crops will be about the same as usual. Vegetables look fair; peas good; beans, corn and potatoes being planted.

Weston (H. L. Brown). — The season is about an average one for forwardness, but May has been very cold and dry. Pastures are short, but mowings got a good start, and fall seeding wintered well. There was a very full bloom of all kinds of fruit, and it has not suffered from frost. There are some tent caterpillars, but insects have not done much damage as yet. Spraying is practised only to a small extent, and is not on the increase. Farm help is

scarce, and about one in ten is good help. Wages average from $20 to $22 per month with board, and from $1.50 to $1.75 per day without board. There are no marked changes in the acreage of farm crops.

ESSEX COUNTY.

Salisbury (Wesley Pettengill). — The season is a good average one to date. Pastures are in fair condition, mowings look well and all grass wintered well. Peaches made a great bloom; pears and plums light; apples about half a normal bloom, as they were very uneven; strawberries were injured by frost. Tent caterpillars are doing some damage. Spraying is done mostly for the canker worm, and is not increasing. Farm help is not very plenty, and about one-fourth of it may be called good help. Wages average from $18 to $25 per month with board, and from $1.50 to $2 per day without board. I think there will be a larger acreage of corn this year than usual.

Haverhill (Eben Webster). — The season was rather cool and dry the first of the month, but we had a good rain this week. Pastures and mowings are looking well; fall seeding washed somewhat in the winter and early spring. There was a large bloom of peaches and plums; apples good; few pears. Tent caterpillars are doing some damage. Spraying is on the increase. Farm help is in about the usual supply, and half of it is good. Wages range from $15 to $22 per month with board, and average $1.50 per day without board. Rather more corn will be put in for the silo.

Rowley (D. H. O'Brien). — The season is a very favorable one. Pastures and mowings promise well, and fall seeding wintered well. The fruit bloom was about half a full bloom; peaches suffered from frosts, other fruits not damaged much. Tent caterpillars are doing some damage. Spraying is not practised much, but is increasing somewhat. Farm help is scarce, and about one-half of it is good help. Wages average from $22 to $24 per month with board, and from $1.50 to $2 per day without board. There will be an increase in the acreage of corn.

Andover (M. H. Gould). — The season is a favorable one. Pastures and mowings started well, but unless we have considerable rain, they will be light; fall seeding wintered well. There was a full fruit bloom, but peaches suffered from frost. Tent caterpillars are doing some damage. Very little spraying is done, but it is increasing. Farm help is very scarce, and there is very little good help. Wages average $20 per month with board, and $35 per month without board. More corn will be raised for the silo than usual.

Danvers (C. H. Preston). — The season is from seven to ten

days ahead of the normal. Pastures and mowings will be light; fall seeding wintered well. There was a very full bloom on all fruits except pears. Tent caterpillars are more plenty than for several years. Spraying is largely practised, and is on the increase. Farm help is scarce. Wages average $20 per month with board, and $36 per month without board. There will be no marked changes in the acreage of the usual farm crops.

NORFOLK COUNTY.

Cohasset (Philander Bates). — The season is an average one. Pastures are in good condition, but mowings are not as good as last year. There is a full bloom on all fruits exceepting pears. Tent caterpillars are doing some damage. Spraying is not practised. The supply of farm help is equal to the demand. Wages average $30 per month with board. There are no marked changes in the acreage of the usual farm crops.

Norwood (Frank A. Fales). — The season is rather dry. Pastures and mowings are light, but fall seeding wintered well. The fruit bloom compared favorably with the average, and has not suffered from late frosts. Very little spraying is done here. Farm help is very scarce, but about half of it is good. Wages average from $20 to $25 per month with board, and $1.25 per day without board. There will be no marked change in the acreage of the usual farm crops.

Westwood (H. E. Weatherbee). — The season is early, but is getting dry. Pastures are rather light, but mowings are looking well; fall seeding winter-killed somewhat. Full bloom of apples and peaches; pears not so full. Spraying is not practised much in this locality. Farm help is scarce, and not over half of it is good. Wages range from $20 to $25 per month with board, and average $40 per month without board. More corn will be planted this year than usual.

Millis (E. F. Richardson). — The season is earlier than usual, and everything had a good start. Pastures and mowings are in good condition; much fall seeding winter-killed. The fruit bloom is extra heavy this year, and there has not been much damage from frosts. A few tent caterpillars have appeared. Spraying is practised somewhat. Farm help is scarce, and about half of it is good help. Wages average from $20 to $25 per month with board, and from $30 to $40 per month without board. More than the usual amount of corn will be planted.

Franklin (C. M. Allen). — Pastures and mowings started well, but it is now too dry for them; fall seeding wintered about

as usual. There was a fine fruit bloom, and but little damage from frost. Tent caterpillars are doing some damage. But little spraying is done, and it is not increasing much. Farm help is scarce, and from 10 to 20 per cent of it is good help. Wages average $20 per month with board, and $1.50 per day without board. There will be an increase in the raising of market-garden crops for home markets.

BRISTOL COUNTY.

Mansfield (Wm. C. Winter). — Planting is somewhat later than the normal; trees, pastures and hardy plants about normal. Pastures and mowings started well, but need rain. The fruit bloom is about average, and has suffered little from frosts. Currant worms are doing some damage. Very little is done in spraying, but it is increasing. Help is scarcer than usual, but generally good. Wages average $16 to $20 per month with board, and $1.50 per day without board. No marked changes in the acreage of farm crops.

Norton (Wm. A. Lane). — The season is an average one. Pastures are looking well, and fall seeding looks well. There was a very full fruit bloom, and the late frosts did but little damage. Potato bugs are doing some damage. There is not much spraying done here. Farm help is very scarce. Wages range from $20 to $26 per month with board, and average $1.50 per day without board. There will not be much change in the acreage of farm crops.

Raynham (E. W. Shaw). — The promise for pastures and mowings is good, and fall seeding wintered well. There was a heavy fruit bloom, and it has not suffered from frosts. Currant worms are doing some damage. But little spraying is done, and it is not increasing. Farm help is very scarce. Wages average $20 per month with board, and $36 per month without board. There will be a less acreage than usual of the usual farm crops.

Berkley (R. H. Babbitt). — The season is about an average one. Pastures and mowings are in very good condition, and fall seeding wintered fairly well. There was a very heavy fruit bloom, and it apparently has not suffered from late frosts. Tent caterpillars, cut worms and wire worms are doing some damage. Spraying is not generally practised, but is increasing rapidly. Poor help is plenty, but good help is scarce, about one-fourth of the supply being good help. Wages average $20 per month with board, and $1.50 per day without board. There will be large acreages of corn and potatoes, and thousands of peach trees are being set out.

Swansea (F. G. Arnold). — The season is about a normal one. Fall seeding wintered well, and meadows started well, but need rain. The fruit bloom is very heavy, and was not damaged by frost in this locality. Elm leaf beetles are doing some damage. Spraying is practised only a very little. Help is very scarce, but most of it is good. Wages range from $15 to $22 per month with board, and are $35 per month and $1.50 per day without board. More corn than usual is being planted.

PLYMOUTH COUNTY.

West Bridgewater (C. P. Howard). — Fall seeding looks well, but old fields will yield light crops. All fruit trees bloomed full. Canker worms and tent caterpillars are doing damage. Owners of fruit trees are having them sprayed. Farm help is plenty. Wages range from $20 to $25 per month with board, and average $1.50 per day without board, with $10 to $12 per week for experienced men.

Marshfield (J. H. Bourne). — The season is about an average one at the present time, excepting for the lack of rain. Fall seeding does fairly well, but even with rain, pastures and mowings promise poorly. Apples, pears and peaches made a full bloom, with little damage by frosts. Tent caterpillars are more plenty than usual. Spraying is very little practised, and is not apparently on the increase. Farm help is rather scarce, with one-fourth of it good help. Wages average from $20 to $23 per month with board, and $1.75 per day without board. There will be a little increase in the acreage of corn; peas and melons are on the increase also as well as poultry.

Hanson (Dr. F. S. Thomas). — The season is about a normal one. Pastures and mowings promise well, and fall seeding wintered well. There was a full fruit bloom, with no damage from frosts. Tent caterpillars are doing some damage. Spraying is not much practised, but is increasing. Farm help is plenty, and of fair quality. There are no marked changes in the acreage of the usual farm crops.

Kingston (Geo. L. Churchill). — The season is rather late. Pastures and mowings are backward. There is a heavy fruit bloom, and it has not suffered much from frost. Tent caterpillars are doing some damage. There is not much spraying done. Farm help is scarce, and perhaps one-fifth of it is good help. We do not board any of our help, and the wages average $1.50 per day without board. There will be no marked changes in the acreage of the usual farm crops.

Lakeville (N. G. Staples). — The season is about a normal one. Pastures are light, but there is a fairly good prospect for hay; fall seeding wintered well. Baldwin apples did not bloom, other varieties good; no damage from frost. Tent caterpillars are doing some damage. Spraying is not practised to any great extent, and does not increase much. Farm help is not very plenty, and about half of it is good help. Wages average $15 per month with board, and $1.50 per day without board. There are no marked changes in the acreage of farm crops in prospect.

Mattapoisett (E. C. Stetson). — The season is a little earlier than the normal. Pastures and mowings are looking well, and fall seeding wintered well. Apples and peaches extra good bloom; pears not as good as last year; no damage from frost. Tent caterpillars are doing some damage. Very little spraying is done in this section. Farm help is scarce, and about half of it is good help. Wages average $20 per month with board, and $1.50 per day without board. There are no marked changes in the acreage of the usual farm crops.

BARNSTABLE COUNTY.

Bourne (D. D. Nye). — The season compares favorably with the normal. Pastures and mowings are in fair condition, but fall seeding did not winter well. The fruit bloom is very good, and did not suffer from frosts. Tent caterpillars are doing some damage. Scarcely any spraying is done in this vicinity. Farm help is scarce, but is nearly all of it good. Wages average from $15 to $20 per month with board, and $2 per day without board. Acreage of farm crops about as usual.

Barnstable (John Bursley). — The season is a little late. It is too dry at present for grass, and fall seeding looks poorly. There was a full average fruit bloom, and very little damage from frost. Tent caterpillars are doing some damage. But very little spraying is done, and it is not increasing. Farm help is scarce, and not over one-fourth of it is good help. Wages average $20 per month with board, and 17 cents per hour without board. There will possibly be a little increase in the acreage of corn.

Dennis (Joshua Crowell). — The season is little in advance of the average. Pastures and mowings are looking fairly well, but need rain very much. The fruit bloom, with the exception of the pear, was very full. Tent caterpillars are very plenty. Spraying is not practised much, but is on the increase. Farm help is not plenty, and one-half of it is good help. Wages average from $20 to $25 per month with board, and from $30 to $35 per month

without board. There will be more corn planted than for several years; other crops about average.

Eastham (J. A. Clark). — The season is ten days earlier than the normal. The prospect for pastures and mowings is poor, on account of lack of rain. There was a full fruit bloom, with the exception of Baldwin apples. The usual insects have appeared, but are not very troublesome. Spraying is not practised to any great extent. Farm help is scarce, but fairly good. Wages average $25 per month with board, and $40 per month without board. Probably more potatoes and corn than usual will be planted. The asparagus season is on, and there is general complaint of a short crop. It is evident the rust is a great injury, and many think it will ruin the business in a few years.

Truro (D. E. Paine). — The season is a fair one. Pastures are looking well, but need more rain; fall seeding wintered well. The fruit bloom is up to the average. Tent caterpillars are doing some damage. Spraying is not practised to any great extent. There is very little farm help to be had, but what there is is good. Wages average from $10 to $15 per month with board, and from $30 to $35 without board.

DUKES COUNTY.

West Tisbury (Geo. Hunt Luce). — The season is about an average one. Promise for pastures is good; mowings fair. There is a heavy fruit bloom, and it has not suffered from frost. Some of our farmers spray their trees, but the practice is not increasing much. Farm help is about equal to the demand, and about one in four is good help. Wages average $18 per month with board, and $1.50 per day without board. The acreage of corn will be increased, and something will be done in hop culture.

NANTUCKET COUNTY.

Nantucket (Wallace Gardner). — The season is a very good one. Grass is looking finely; pastures very good; fall seeding extra good. Fruit looks better than for many years. Spraying is not practised, as we do not raise much fruit. American help is scarce, but Portuguese help is plenty and good. Wages range from $12.50 to $20 per month with board, and average $1.50 per day without board. There will be a great increase in the acreage of grain, more than four times as much oats, barley and corn being put in than in any year for the past twenty years.

BULLETIN OF

MASSACHUSETTS BOARD OF AGRICULTURE.

CUCUMBER GROWING IN MASSACHUSETTS.

By Prof. Geo. E. Stone, *Professor of Botany, Massachusetts Agricultural College.*

The cucumber industry is of some importance in this State, when one takes into consideration the amount of fruit grown under glass and that grown out of doors. It was not many years ago that cucumbers could be obtained only during their natural season. This, however, is not true at the present time, inasmuch as cucumbers can be obtained in the market at any season of the year. In some sections of the State there are many greenhouses devoted to the production of winter cucumbers under glass, which frequently bring a high price. These are not only grown to supply the Massachusetts markets, but many of them are shipped to New York. The winter prices of cucumbers range from $0.75 to $3 per dozen, according to the season, and even at $1 per dozen there is a fair return for the care involved and labor expended on their production, providing diseases do not interfere with the normal yield of the crop. The production of greenhouse cucumbers in this State is on the increase, as shown by the building of many new houses each year, which are either wholly or partially devoted to cucumber growing. The increase in the number of cucumber houses is not so great as in those devoted to lettuce. Since, however, most lettuce growers raise a spring crop of cucumbers in their houses each year, the production has increased. The growing of outdoor cucumbers is carried on extensively in some localities. In one small section of the Connecticut valley 100 acres or more are grown.

The Cucumber Plant.

The cucumber (*Cucumis sativus* L.) belongs to the cucurbitaceæ or gourd family, to which other important economic plants, such as the melon, squash, pumpkin, etc., belong. It is a dicotyledonous plant, *i.e.*, it has two cotyledons or seed leaves, which are familiar to all who

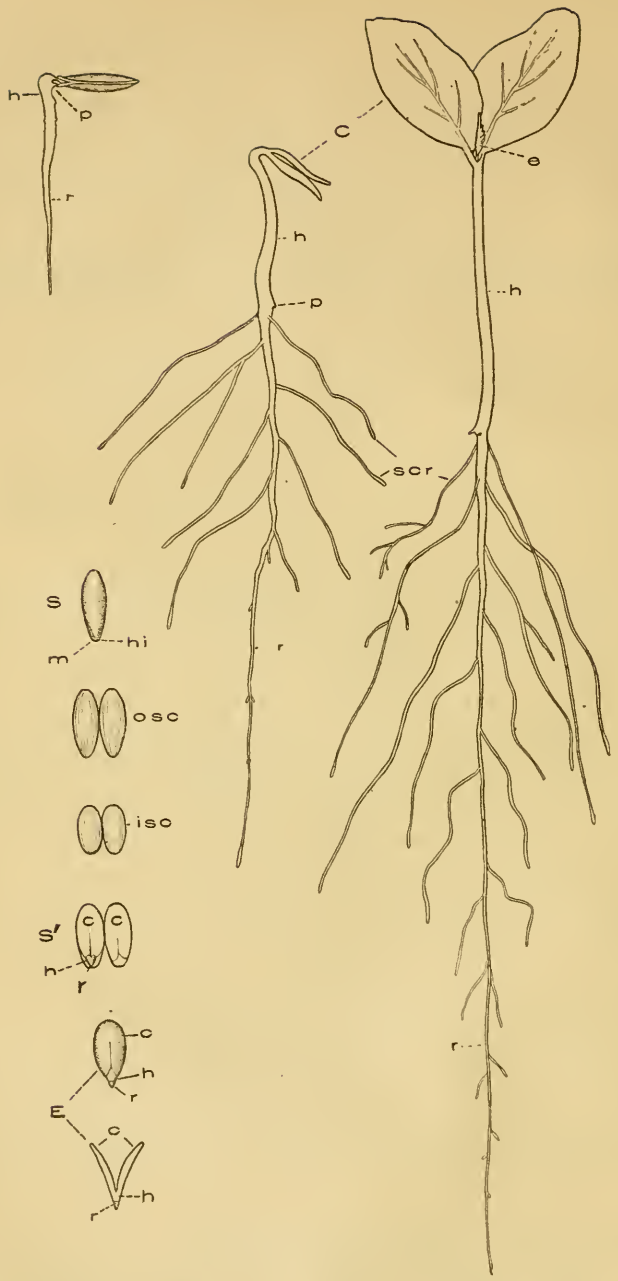

FIG. 1.—Showing three stages in the development of the cucumber seedling: *S*, seed; S^1, seed split in halves; *E*, embryo; *hi*, hilum; *m*, micropyle; *r*, radicle; *h*, hypocotyl; *osc*, outer seed coat; *isc*, inner seed coat; *c*, cotyledon; *e*, plumule; *scr*, secondary roots; *p*, peg.

have observed its germination and development. The cucumber seed is of medium size, and not particularly well supplied with an over-abundance or great variety of reserve material for independent growth, as shown by its habit of throwing up its cotyledons quite early in its period of development. The cotyledons are withdrawn from the seed coat at an early period, and as soon as they become exposed to the light they turn green. At this period they commence to assimilate food from the air, through the ability of the green cotyledons to decompose the atmospheric carbon-dioxide under the influence of light.

The principal reserve materials which seeds contain are starch, proteids and oils. All seeds, however, are not supplied with these three reserve material constituents, but, on the other hand, they may possess only two of these, such as proteids and oils. Such seeds as the pea, horse bean, etc., which contain an abundant supply of the three kinds of reserve material, do not lift their cotyledons into the air, but remain submerged; whereas such plants as the sunflower, white lupine, etc, that contain only proteids and oil (which constitutes a one-sided and incomplete supply of reserve material), immediately push their cotyledons above ground. The reserve material endowment of this latter class of plants causes them to unfold their cotyledons and expose them to the light, by which means they are enabled to assimilate food from the air, thus supplying their inherent deficiencies.

The seed of the cucumber belongs to this latter class, *i.e.*, it contains proteids and oil as a reserve material, but no starch. Hence arises the necessity of utilizing its cotyledons as assimilating organs at a very early stage in its development, in order that the plant may be supplied with carbohydrate material for metabolism and growth. Fig. 1 shows an illustration of the seed of the cucumber and its various parts, together with the seedlings in different stages of development. Usually one end of the seed is thinner and more pointed than the other. The pointed end is where the root protrudes during the process of germination, and is that part of the seed where it is attached in the ovary or fruit, as is shown by the scar, which is known as the hilum. When seeds are soaked in water for a few hours, they swell up. If we squeeze a water-soaked seed, it will be seen that water exudes at the hilum end. This is because there is a pore at that end called the micropyle, which enables the seed to absorb water readily. The seed is provided with two coats: an inner one, which is thin and transparent; and an outer one, which is opaque. Inside the coats is what is called the embryo, which consists of two cotyledons, or seed leaves; the radicle, or root; the hypocotyl, or that portion of the stem under the cotyledons; and the plumule, or developed stem. The embryo constitutes a minute plantlet. Three different stages of germination are also shown, and the various parts which we saw in the embryo have become greatly extended and developed. The cucumber plantlet has an ingenious and peculiar way of getting out of its coats. The one-sided outgrowth (*p*) near the radicle and hypocotyl, known as a peg, acts as a lever in spreading the micropyler end of the seed, by which means the cotyledons may be more conveniently withdrawn.

Varieties of Cucumbers grown.

Most of the varieties of cucumbers grown in greenhouses are the White Spine or some similar strain, and in many instances a Hybrid type is grown. This usually consists of a cross between the White Spine and Telegraph, or some other English type of cucumbers. The Telegraph bears large fruit, generally from 18 to 20 inches or more in length, and is largely used in forcing houses in England. In this country it does not find so ready a sale as the shorter varieties. Many people, however, who have eaten the long English Telegraph, like it; and, if it were found more extensively in the markets, there is no doubt but that it would be utilized more largely. A stock of White Spine having about one-fourth of the English Telegraph in it (which constitutes the Hybrid type) makes a cucumber slightly longer than the White Spine, and of a considerably darker color. The quality of the Hybrid is good, but is not superior to the White Spine. The darker green color makes it more desirable for some marketmen than the lighter colored White Spine. The vine of the English Telegraph is a more rapid grower than the White Spine, and perhaps more inclined to wilt than the latter. The Telegraph, so far as our experience goes, sets all its fruit on the laterals; whereas the White Spine and other varieties bear some fruit on the main shoot.

Types of Houses devoted to Cucumbers.

In the economic production of cucumbers under glass the style of house utilized plays an important role. As a rule, cucumber houses have double glass, *i.e.*, they are constructed out of two layers of glass set about 1½ or 2 inches apart, leaving an air space in between. The object of this is to prevent the radiation of heat, or, in other words, to save coal. Most cucumber houses are from 15 to 23 feet wide, and scarcely ever exceeding 200 feet in length. They have benches along the sides and in the middle, the side rows of cucumbers being trained up the sides and roof, while the middle ones are trained vertically. These houses are usually heated with hot water. The beds are generally slightly raised above ground, and contain in depth about 1 foot of soil. They are frequently provided with porous tile, which is used for the purpose of sub-irrigation, and, if necessary, can be used for sterilizing the soil. When cucumbers are grown in lettuce houses, they are planted directly in the ground beds, the rows, some 8 or 10 feet apart, being trained in the form of the letter "A." The type of house utilized by lettuce growers is preferable for the production of cucumbers grown at any season of the year, but there are only a few instances where this type of house is used exclusively for this purpose. The light conditions and exposure of the plants are much more favorable when grown in a lettuce house than when grown in a typical cucumber house. Lettuce houses are wider than cucumber houses, and generally longer; but, notwithstanding this, they can be built at a less cost per linear foot than houses which are narrower. From a large number of statistics which we have obtained relating to the cost of various types of houses devoted

to cucumbers and lettuce, it is evident that the largest houses cost the least, whether reckoned by cost per linear foot or cubic contents. For example, a house 40 feet wide can be built proportionally cheaper than one 20 feet wide. The average cost per linear foot of a number of houses ranging from 18 to 23 feet in width, without piping or boiler, was $18.86; that of a number of houses 36 to 40 feet in width averaged about $10 per linear foot From these figures it is clear that a large house costs less per unit of structure than a small house, and the cost of operating the same is less. The cost of crop production is cheaper in a large house than in a small one; and it would be more economical to manage one large house, 40 by 300 feet, than three small ones, 20 by 200 feet, having the same total area.

Transplanting Cucumbers.

Most greenhouse cucumber growers start their seed in boxes, or in beds in special houses. When the seedlings are from 2 to 4 inches high, they transplant them into pots; they are allowed to grow 6 to 8 inches high in pots before transplanting in the house. Some growers transplant twice in pots, and, as a rule, the seedlings are planted deeper each time in the soil, so that the cotyledons are just above the surface. It is claimed that a better root system is developed by this practice. The principal object to be gained by transplanting cucumbers is the saving of space, time and heat. Plants sufficient for a large establishment can be started in a small house especially devoted to seedlings, which does not require much expense to operate; whereas, if the seeds are sown directly in beds, and not transplanted, it is necessary to go to the expense of heating a large house. It is also claimed that transplanted cucumbers will grow faster and make better plants. Our own experiments have not verified this statement, as we have never seen any difference in size of our plants, whether they were transplanted or sown direct in the beds. Other than the saving in space, heat, etc., which are important, we have never seen any advantage in transplanting cucumbers.

Temperature required for Indoor Cucumbers.

Where cucumbers are grown under glass, it is necessary to supply them with considerable heat, the night temperature required being about 65° F., and the day temperature about 85° F. The temperature requirement varies with the condition of the weather. Higher temperatures can be maintained during sunshine than during cloudy weather. Houses are frequently run in the day time at a temperature exceeding 85° F. High temperatures during cloudy weather will produce a weak growth, lacking a sufficient texture of foliage, etc., which would result in the plant possessing a marked tendency to wilt in strong sunlight. The conditions which cucumbers are subject to under glass are by no means the same as those which occur in the summer out of doors. Indoor cucumbers are subject to very different moisture conditions, and in the winter the light is none too good for a plant whose requirements demand strong light. In order that cucumber plants may be induced to

grow under these adverse conditions, heat is substituted for light, as a stimulus; which results in producing plants possessing a much more delicate structure, and consequently rendering them much more susceptible to certain diseases. All cucumber crops grown under glass are more or less abnormal, or, in other words, they are forced; but there is considerable difference in the amount of forcing they receive by different growers, owing to different conceptions of manipulating the crop.

Fertilization of Flowers.

Cucumbers are monœcious plants, *i.e.*, the sexes are borne in separate flowers on the same plant. For this reason, when cucumbers are grown in greenhouses it is necessary to resort to hand pollenation, or else to employ bees to carry the pollen from the staminate to the pistillate blossoms. Bees are generally abundant enough in summer to accomplish fertilization of outdoor crops. It is stated, however, by some authorities, that certain varieties of cucumbers, such as the Telegraph, or long English types, do not require fertilization, inasmuch as the fruit matures, whether fertilized or not, in which case a seedless fruit is formed. Crooked or imperfectly developed cucumbers are not infrequently produced on vines. It is maintained by some authorities that crooked or ill-formed fruit is the result of imperfect fertilization. In many instances this is no doubt the case, but there are other causes underlying the production of inferior formed fruit. It can be safely stated, however, that good plants are endowed with the capacity to produce good fruit, and conversely that it must not be expected that perfect fruit will be produced on weak plants. From our observations we are led to believe that crooked or imperfectly developed cucumbers are in the largest number of cases produced by plants which are not normal. For example, plants affected with nematode galls, or weakened by thrips, etc., will develop poor fruit. Anything, in fact, that affects assimilation or interferes with the normal function of the plant weakens it, and the result is poorly developed cucumbers.

Pruning Cucumbers.

When cucumbers are grown under glass in winter, the amount of space the plants occupy, together with the amount of fruit which they produce, is of prime importance, from an economic point of view. Under these conditions it is quite essential that as many plants shall be grown as possible, without overcrowding or interfering with conditions suitable for maximum production. To secure the best results in the least space, the plants are trained on wires or sticks, in order to use space to the best advantage. The cucumber plant is a prolific grower, and requires a great deal of space if allowed to develop naturally. As there is nothing to be gained in allowing a plant grown under glass to develop in its own manner, the practice of pruning is resorted to. Since the question of utilizing valuable space is an important one, it is necessary that the production of the greatest amount of fruit should be restricted to the least possible space consistent with the normal requirements of the plant. One of the objects of pruning is, therefore, to confine the growth

of the plant to certain definitive areas, and to concentrate the formation of fruit on the plant to certain desirable positions. In the growing of out-door cucumbers pruning is not practised, so far as I am aware, but it might be in some instances to advantage.

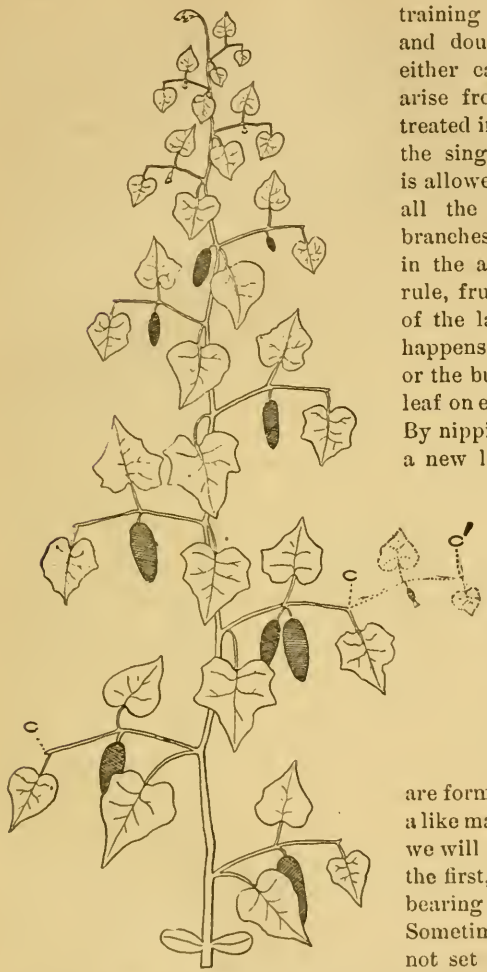

Fig. 2.—Showing the single-shoot cucumber plant, with fruit set in the first axils of the laterals. The laterals are pruned at c. The dotted lines represent a new lateral, or tertiary branch, formed on an axillary, which is also nipped at c^1.

The two common methods of training are known as the single and double shoot systems. In either case the laterals which arise from the main shoot are treated in the same manner. In the single-shoot system a leader is allowed to grow together with all the laterals or axillary branches which normally occur in the axil of each leaf. As a rule, fruit sets in the first axils of the laterals, and in case this happens the laterals are pruned or the bud nipped at the second leaf on each lateral (see Fig. 2, *c*). By nipping the bud or shoot at *c*, a new lateral will form at this point, which, if allowed to grow, will form another axillary branch, which will set fruit as a rule in the first axil, as shown in the figure. The new lateral can be treated in the same way as the others, *i.e.*, it can be cut or nipped back at c^1. As new laterals are formed they can be pruned in a like manner, as a result of which we will have axillary branches of the first, second, third order, etc., bearing fruit in their first axils. Sometimes, however, fruit does not set in the first axils of the laterals, but may in the second or third axils. In that case the lateral is nipped at the first leaf beyond, or at the third or fourth node of the lateral. By this method of pruning there is a concentration of fruit on the plant to parts near the main shoot; for if the laterals were allowed to grow, they would as a rule produce fruit only in every seventh axil, as is the case with the main shoot. From

numerous observations which we have made on various crops, we have found that a very large percentage of the pistillate flowers of the laterals occur in the first axils. The largest number of internodes occurring between the successive formations of fruit on the plant was seven; in other words, fruit is found in the largest number of cases in every seventh axil.

In the development of the two-shoot system it is necessary that the plants should be manipulated when small, or at that period when two leaves have developed. The plant in this stage of development is shown in Fig. 3, in which case the dotted lines represent the plant as it will appear as a result of cutting the leader at *c*. The cutting is best accomplished with a sharp knife, when the bud of the leader is very small. This causes a shoot to develop in the axil of the cotyledons and another at *c*. In this case we have a plant where two laterals form the two leaders. The subsequent process of pruning is similar to that described under the single-shoot system.

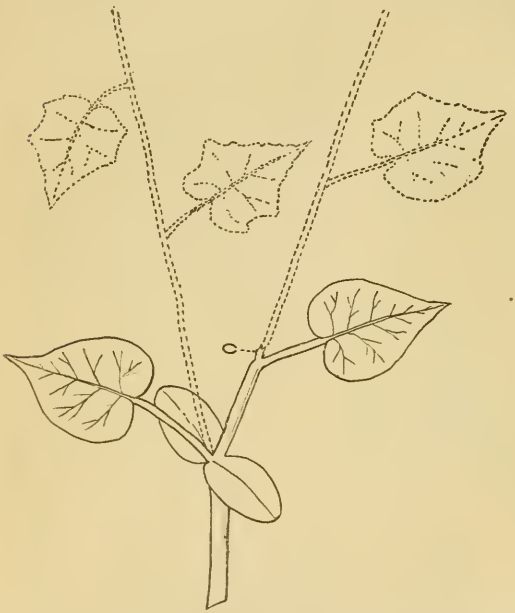

Fig 3.—Showing the development of the two-shoot system. The leader is cut at *c*, and two new laterals or leaders develop, as shown in the dotted lines.

There is a difference of opinion as to the relative merits of the single and double shoot system, some cucumber growers preferring the one-shoot system, and others preferring the two-shoot system. On this point, however, it may be stated that cucumbers do not stand overcrowding; and when they are planted in the greenhouse 2 feet or 30 inches apart, we believe the single-shoot system is equal if not superior to the two-shoot system. In some of the largest crops of cucumbers which we have ever observed the plants have had ample room for development. In one instance, where a third row of vines was planted in a good-sized house, the crop was only one-third of that where two rows were planted.

A number of experiments have been made by us in pruning cucumber plants; space does not permit us to go into a full discussion of the results of these experiments at the present time. However, some of the main points deducted from them can be pointed out in a brief manner.

In one experiment that was made on all the plants constituting a crop, in which case a single leader and several of the laterals were allowed to grow without pruning, the following points were noticed: —

The average yield of fruit on the main shoot was 18 per cent higher than upon the laterals. The lowest laterals, or those nearest the base of the plant, came next in the production of fruit, and the others or higher laterals followed in uniform succession in fruit production. The maturing of the fruit was more marked upon the main shoot than upon the laterals. Of the various laterals, the lowest ones most nearly approached those of the main shoot in maturing its fruit. The main shoot showed a gain of 36 per cent in maturing of the fruit over that of the first lateral. Of the fruit formed on the laterals, 61 per cent occurred in the first axils. The number of internodes between successive formation of fruit on the plant was in the largest number of cases seven.

In another experiment in the same house the plants were allowed to develop a single leader, and as many laterals as would appear. The latter, however, in this experiment were pruned at the second leaf, or, in case fruit did not set in the axil of the first lateral, they were pruned just beyond the axil where it did set, but it was usually at the second axil. It was found in this experiment that there were 30 per cent more flowers of both sexes on the laterals than on the main shoot, and that there were 53 per cent more staminate than pistillate flowers on the whole plant. It was further found that there were 93 per cent more pistillate flowers on the laterals than on the stem or main shoot; and, of the total number of pistillate flowers which made their appearance on the laterals, 87 per cent were found in the axils of the first leaf, whereas only 13 per cent were found in other axils. There were practically no differences in the maturity of the fruit found on the main shoot and laterals in this experiment. In these two experiments we have a chance to compare the differences existing between plants where the laterals were pruned and those that were not pruned, the latter or unpruned ones forming all the laterals they desired. In the first experiment, where the laterals were not pruned, the yield of the fruit was 18 per cent higher on the leader or main shoot than on the laterals; whereas in the latter experiment, where the laterals were pruned, this was reversed, and in this case there was 93 per cent more fruit formed on the laterals than on the leader. In the first experiment, the fruit on the leader matured earlier than on the laterals; in the latter experiment, where pruning was practised, there was practically no difference. Cutting the leader of the main shoot or pruning the laterals caused an increase in the number of laterals. Where laterals are not cut, they are not formed as a rule in the axil of every leaf. Pruning appears to cause a larger amount of fruit to set in the first axils of the laterals, as it was found that in the experiment where pruning occurred 87 per cent of the axils contained fruit, against 55 per cent where no pruning took place. In some instances where the leader was nipped on unpruned plants, this succeeded in causing a slight increase in the amount of fruit in the first axils of the laterals.

In conclusion it may be stated that the advantages of pruning are that the fruit is concentrated on the plant to a greater extent than it

would be if the plant were not pruned, and that the largest amount of fruit can be obtained in the shortest time. The amount of fruit occurring in a single axil is also greater. We have seen crops which would produce in a large number of instances as many as half a dozen cucumbers in a single axil. From our experience, it would seem that a plant pruned would produce more fruit than one not pruned, or, in other words, the pruning increases the yield; as in the two experiments noted there was a larger yield obtained from the pruned plants, although the crops were grown on successive years, and hence not under exactly similar conditions.

Cucumber Diseases.

Both indoor and outdoor cucumbers are subject to a number of diseases. Many of these troubles are directly traceable to the gardener; or, in other words, diseased conditions of the plant are brought about by a lack of knowledge and skill in handling the crop. This particularly holds true where cucumbers are grown under glass, in which case the gardener to a large extent is responsible for the plant's environment. The gardener who grows outdoor cucumbers must submit largely to conditions and circumstances which he cannot control although it is possible under these circumstances for one to modify to some extent the conditions of his crops to better meet these adverse external influences. Cultivation of outdoor cucumbers has met with many drawbacks during the last few years, and the same holds true in regard to the melon industry. This condition of affairs is mostly caused by the presence of certain fungi that attack the foliage. Experience has shown that the use of ordinary fungicides and the application of the common methods of spraying have little control over these pests. The most serious fungous diseases affecting outdoor cucumbers at the present time are those caused by the anthracnose and downy mildew, and bacterial wilt is more or less prevalent. Indeed, the ravages caused by the presence of the fungus known as the anthracnose are so great that it is a question at the present time whether it is worth while to attempt to raise cucumbers and melons out of doors, or at least not until some more efficient methods have been discovered than those utilized at present.

Some of the principal diseases with which cucumbers are affected are as follows: —

Powdery Mildew (*Erysiphe Polygoni* DC.). — This is a white, mildew-like growth, which occurs on the upper surface of the leaves, and is not uncommonly seen on cucumbers grown under glass. It occurs most frequently in houses which are kept too moist and dark, and which lack ventilation. The most successful method of preventing mildew is to give the house air and light, and hold the moisture down. This results in producing a crop possessed of firm texture, which will be less susceptible to mildew. In case the mildew has become once established in the house, through some mismanagement of the crop, the plants can be sprayed with ivory soap and water, mixed at the rate of one bar of ivory soap (10-cent size) to 15 gallons of warm water. This should be applied when first made, and when warm. Bees constitute

the most active agent in the spread of mildew. If a few leaves become infected in the house when the bees are active, it does not take a great while for them to infect the whole crop. Care should be taken in such cases to destroy the first signs of mildew as it appears.

Timber Rot (*Sclerotinia Libertiana* Fckl.). — This disease is common to both cucumbers and tomatoes. It attacks the stem, causing a shrivelled, dry and lifeless appearance of that portion affected Black masses, or sclerotia, which are about $\frac{1}{32}$ to $\frac{3}{16}$ inch in diameter, appear on the surface of the affected region. These will germinate and infect other plants, if the conditions are favorable. The fungus which produces the timber rot is confined to the soil, and is supposed to be the same as that which causes the so-called " drop " in lettuce. It does not, however, cause very much damage to cucumbers and tomatoes, as a rule. Should it ever become serious, the only remedy to apply will be to sterilize the soil. Under the most favorable conditions this method of treatment can be applied at a low cost at the present time, and, when thoroughly done, it constitutes an absolutely positive remedy for this and other diseases that have their origin in the soil.

Damping off (*Pythium De Baryanum* Hesse.). — Seedling cucumbers very frequently damp off when placed under unfavorable conditions. The principal unfavorable conditions which give rise to damping off are lack of light, too close planting, too much heat and moisture, — or, in fact, anything which tends to produce weak, spindling seedlings. For this troublesome disease the method of prevention is obvious, viz , to eliminate the conditions which favor the growth of the fungus. Damping off almost invariably occurs on seedlings, and seldom affects plants which have developed a leader 5 or 6 inches long. If it is necessary to force seedlings, or place them under conditions which favor the development of the damping fungus, a positive prevention can be had in sterilizing the soil. Since the amount of soil which is necessary to start many hundreds of seedlings is small, this method of treatment can be applied at an insignificant cost, and, besides acting as an efficient remedy for damping off, the germination of the seed and development of the plant will be greatly accelerated.

Downy Mildew (*Plasmopara Cubensis* (B. & C.) Humphrey). — This mildew made its appearance for the first time in Massachusetts in 1890, and it was not observed again until 1899. Since this latter date it has been present each year in both indoor and outdoor cucumbers and melons. It does the most damage, however, to outdoor crops of cucumbers and melons. There is something peculiar in the history of this mildew, as it is not known positively where it originated, nor why it should appear so suddenly over a wide area. The mildew can be seen on the under side of the leaves, and its identification can best be established, with the naked eye, by the characteristic small whitish or yellow angular spots which occur on the leaves. Its occurrence on greenhouse plants is not, however, of serious consequence, as it appears only on crops that are planted early, and no record of its appearance later than December is known in this State. We have never known indoor cucumbers started in October or November to be affected with this fungus, but those started in August or September are likely to be.

From this it appears that greenhouse crops started in August or September become affected from outdoor crops, as this is the time the mildew is prevalent on outdoor cucumbers. This mildew can be completely controlled by spraying with Bordeaux mixture every two weeks; but for indoor cucumbers it would be better to plant them in October or November, rather than earlier, as there is little likelihood of these becoming infected.

Anthracnose (*Colletotrichum Lagenarium* (Pass.) Ell. & Hals.). — At the present time this fungus causes more trouble to outdoor cucumbers and melons than all other organisms combined. The attack has been so severe in some instances that it is almost impossible to succeed in raising a crop without having it all destroyed before maturing the fruit. The first indications of anthracnose are yellow spots on the leaves, which multiply and enlarge, and in a very short time the whole plant succumbs. The spread of the disease is frequently so rapid that it only requires a few days for the entire crop to die. Crops killed by this fungus present a dry, parched aspect, as if they had been subjected to hot and dry winds of the greatest intensity. Greenhouse cucumbers are also affected with anthracnose in the spring of the year. We have, however, never observed this fungus on indoor crops earlier than March 24. The anthracnose does not appear so destructive in the greenhouses as out of doors; at least, greenhouse cucumbers will continue to live some time after being infected with this fungus. All of the experiments made in spraying for the control of the anthracnose have been very discouraging. About all that can be said at the present time is that vines thoroughly sprayed every one or two weeks will remain green slightly longer than those not sprayed. During the season of 1901 it caused an immense amount of damage to melons, making its appearance during the latter part of July in this State.

Bacteria Wilt. — Many cucumbers grown out of doors frequently become wilted. It is caused in many cases by bacteria, which multiply so rapidly in the plant as to clog up the vessels. Since there are certain worms which affect the roots and stems of cucumbers that also cause wilting and subsequent collapse of the plant, care must be taken to distinguish between these two troubles. If the wilting is caused by worms, an examination of the roots will show its presence; whereas, if caused by bacteria, the roots may appear perfectly healthy. If the wilt is caused by bacteria, sections of the leaf petiole about one inch long, placed under a tumbler, or in any moist place, will exude a mucilaginous material from their ends. This constitutes a rough method of diagnosing the disease, the exudation being caused by the bacteria multiplying so rapidly in the tissues that they are forced out. No effective remedy is known for the bacterial wilt at the present time.

Other Troubles. — Some other difficulties which growers of greenhouse cucumbers have to contend with are caused by organisms belonging to the animal kingdom, such as aphis, thrips and nematode or gall-forming worms. Fumigation with tobacco is the general method of treatment employed for the two former pests, while freezing or sterilizing the soil constitutes efficient remedies for the extermination of nematode worms.

SERIES OF 1902. BULLETIN NO. 2.

MASSACHUSETTS

CROP REPORT

FOR THE

MONTH OF JUNE, 1902.

ISSUED BY

J. W. STOCKWELL

SECRETARY STATE BOARD OF AGRICULTURE.

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1902.

Crop Report for the Month of June, 1902.

Office of State Board of Agriculture,
Boston, Mass., July 1, 1902.

Bulletin No. 2, Crop Report for the month of June, is herewith presented. Owing to the great call for information in regard to scale insects, and our supply of the Bulletin for May, 1901, having become exhausted, we have thought it best to reprint the article on "Three common orchard scales," by Henry T. Fernald, Ph.D., professor of entomology at the Massachusetts Agricultural College, which appeared in that bulletin, and which will be found printed at the close of this one. We regret to disappoint such of our readers as may have been looking for a fresh article on some timely phase of the farming industry, and shall endeavor to meet their desires in our future issues.

Progress of the Season.

Preliminary reports to the United States Department of Agriculture (Crop Reporter for June, 1901) indicate a reduction of about 2,511,000 acres, or 12.8 per cent, in the acreage of spring wheat. The average condition of spring wheat on June 1 was 95.4, as compared with 92 last year, 87.3 in 1900, and a ten-year average of 92.6, the present reported average condition having been exceeded only three times in the last fifteen years. The average condition of winter wheat was 76.1, as compared with 76.4 on May 1, 87.8 on June 1 of last year, 82.7 in 1900, and 80.3, the mean of the June averages of the last ten years.

The total reported acreage of oats is about four-tenths of 1 per cent in excess of the acreage harvested last year. The average condition of oats was 90.6, against 85.3 on the corresponding date last year, 91.7 in 1900, and a ten-year average of 90.

The acreage reported as under barley exceeds the acreage harvested last year by 8.5 per cent. The average condition

of barley was 93.6, against 91 on June 1, 1901, 86.2 in 1900, and a ten-year average of 88.6.

The acreage under rye shows a reduction of five-tenths of 1 per cent from that harvested last year. The average condition of rye was 88.1, as compared with 93.9 last year, 87.6 in 1900, and a ten-year average of 89.3.

The acreage of clover follows the average of the last ten years very closely, with perhaps a slight falling off in the States of the middle west. In condition clover shows a falling off in some States and a corresponding gain in others, so that there is probably little variation from the ten-year average for the country at large.

The average condition of the apple crop was, on the whole, unfavorable, but two States reporting a condition above the ten-year average, viz., 1 point in North Carolina and 6 points in Michigan, while Maine shows a condition of 93, corresponding to the ten-year average. New York reports a condition 5 points the ten-year average; Illinois and Iowa, 9 points; Ohio, 12; Pennsylvania and Kansas, 16; Kentucky, Virginia and Tennessee, 17; Missouri, 18; and Indiana, 19 points; and in the remaining States it is probable that considerably less than an average crop will be produced.

The present prospects for the peach crop are quite favorable, notwithstanding the fact that several important peach-growing States report conditions considerably below their ten-year averages.

The rice area has been decreased in certain States and increased in others, the increase of 60 per cent in Texas probably making the total area under rice fully equal to that of last year, and the condition about approximates the eight-year average for the crop.

The exceedingly favorable weather of May made a marked improvement in the condition of spring pasture, but two of the important States, New York and Pennsylvania, showing conditions below those of May 1.

The total area planted in cotton is estimated at about three-tenths of 1 per cent less than the acreage planted last year, or about 27,878,000 acres. The average condition of the growing crop May 26 was 95.1, as compared with 81.5

on May 20 of last year, 82.5 on June 1, 1900, 85.7 on June 1, 1899, and a ten-year average of 86. Only twice within a period of twenty-one years has the average condition June 1 been as high as the condition reported this year.

In Massachusetts the acreage of oats compared with that harvested last year was given as 96, and the average condition June 1 as 90; the acreage of rye as 97, and the condition 87; the acreage of clover as 97, and the condition as 93; the average condition of spring pasture as 89; the average condition of apples as 90; and the average condition of peaches as 86.

Temperature and Rainfall for the Whole Country.

[From United States Climate and Crop Bulletins.]

Week ending June 2. — The week averaged cooler than usual on the Pacific coast, over the western portion of the Plateau districts, in the lower Missouri valley, over the northern portion of the west Gulf States, and generally in all districts east of the Mississippi, being decidedly cool in the interior valleys of California, the Ohio valley, Tennessee and interior portions of the Middle Atlantic States. Freezing temperatures occurred in portions of the Plateau region and at a few of the extreme northerly stations in the upper Lake region and northern New England. Heavy rains fell in Oklahoma, north-western Texas, portions of New Mexico and Colorado, and over an area extending from the upper Lake region westward to central Montana. Abundant rains also fell in portions of the lower Missouri and upper Mississippi valleys, over the greater portion of the Florida peninsula and portions of the Middle Atlantic States and New England. There was less than the average rainfall in the upper Lake region, the northern portion of the upper Mississippi valley and the central Missouri valley.

Week ending June 9. — The week averaged warmer than usual over nearly the whole of the country, but the temperature excess was generally slight in the central valleys and Atlantic coast districts. Nearly normal conditions prevailed on the Pacific coast. The week was cooler than usual over the northern portions of the Lake region and the upper Missouri and Red River of the north valleys, Montana and

Idaho. Freezing temperatures occurred over the central and southern Rocky Mountain districts and extreme northern portions of the upper Lake region. The week was rainless over most of the central and west Gulf districts, and less than the usual amount fell in the Middle Atlantic States and southern New England. There was also less than the usual amount of rainfall in portions of the Ohio valley and lower Lake region, and generally throughout the Rocky Mountain districts. In the lower Missouri, upper Mississippi and Red River of the North valleys, and over most of the Lake region, the rainfall was largely in excess of the average.

Week ending June 16. — The week was slightly cooler than usual on the immediate Pacific coast and in the extreme northern portions of the country from Maine to Washington. It was also slightly cooler than usual over a small area on the south Atlantic coast. Throughout the southern portion of the Lake region, the central valleys, Middle Atlantic and Southern States, and in the central and southern Rocky Mountain districts, the week was warmer than usual. The week was rainless over nearly the whole of the central and west Gulf districts, and very little rain fell over much of the Middle Atlantic States. In Florida, Georgia and the greater part of the Carolinas exceptionally heavy rains fell. Very heavy rains also occurred in the lower Missouri and upper Mississippi valleys and over the southern portion of the Lake region, while good rains fell over the greater part of the Ohio valley, the northern portion of the Middle Atlantic States and New England. Practically no rain fell in the Pacific coast States.

Week ending June 23. — The week was decidedly cool throughout the central valleys and Lake region and over the interior portions of the Middle Atlantic States and New England. Along the south Atlantic and Gulf coasts the week averaged slightly warmer than usual, and over the western portions of the Plateau districts and the adjacent portions of the Pacific coast regions it was considerably warmer than usual. The night temperatures were unusually low in all districts east of the Rocky Mountains, with the exception of the lower Lake region, New England and the

South Atlantic States. Ample rains fell during the week over most of the Atlantic coast districts, and excessively heavy rains occurred in the lower Missouri valley, including portions of Arkansas and western Tennessee. The greater portion of the Lake region and most of the Ohio and upper Mississippi valleys received good showers, although the total fall in these districts was considerably below the average. The Middle Rocky Mountain States received only very light showers, and on the Pacific coast and over the most of Texas there was no rain.

Special Telegraphic Reports.

[Weather Bureau, Boston.]

Week ending June 2. — New England. Boston: General showers first of week delayed planting, but benefited grass and grain; cool nights retarded growth of crops; frosts general, 26th, caused slight injury; grass improving; potatoes planted in north portion, being hoed south; fruit generally setting well.

Week ending June 9. — New England. Boston: Grass mostly good, and making fair growth; garden truck and tobacco backward: fruits setting well, and promise good crop; excessive rains in northern Maine retarded work; beneficial showers in portions of southern district, but more rain needed.

Week ending June 16: — New England. Boston: Cool nights continue: rain general over district, delaying work in north, beneficial in south; sunshine and warmer weather needed; oats heading well; rye being cut; corn doing well, but needs sunshine; fruit prospects generally considered good.

Week ending June 23. — New England. Boston: Weather generally favorable; copious rains general and of much benefit in southern portion; sunshine needed; corn, potatoes and gardens backward in north, average south; grass good on lowlands, light crop being cut on uplands; apples setting well, except Baldwins; pears promising; peaches fair; tobacco good, although damaged somewhat by winds.

The Weather of June, 1902.

The month opened with several warm days, and the weather conditions were very favorable and seasonal. The temperatures during the first and the second days ranged in the 90's in many sections. Before the close of the first week, however, there was a sharp drop in the mercury, and, with slight exceptions, the weather has been cooler than is usual for the season for the remainder of the month. The nights were, as a rule, exceptionally cool, and there were reports of light frosts in some localities, where the conditions were favorable. During the first ten days of the month the rainfall was quite equally distributed, and the conditions as regarded moisture were near normal. From the 10th to the 22d little rain fell in eastern sections of the State, and the ground, especially in high or up lands, became very dry, and vegetation suffered for need of water. Copious showers and rains occurred during the closing week of the month in about all sections, and the droughty conditions were relieved. In many sections the rains came too late for grass lands and early vegetables, and short crops will result. The deficiency in temperature will probably average over one degree per day, as compared with the normal temperature of the month. A conspicuous feature of the weather was an absence of the usual number of thunderstorms, but of the few that occurred some were unusually violent. Viewed as a whole, the weather of the month was unusually cool, but very pleasant.

In the circular to correspondents returnable June 24 the following questions were asked: —

1. What insects are proving injurious in your locality?
2. How is Indian corn looking, and what is the acreage as compared with previous years?
3. Has haying begun, and what is the prospect for the crop?
4. How does the acreage of early potatoes compare with previous years, and what is the promise for the crop?
5. How do early market-garden crops compare in yield and price with former years, and what is the prospect for those not yet harvested?

6. How do the quantity and price of dairy products, and the supply and price of dairy cows, compare with former years?

7. What is the condition of pasturage in your locality?

8. What is the outlook for such fruits and berries as are grown for market, naming them?

Returns have been received from 170 correspondents, and from them the following summary has been made up: —

Insects.

Insects appear to have done but little damage as yet, the cold weather having, perhaps, operated to hold them in check. Potato bugs are as prevalent as usual, but are not reported as doing any particular damage. Other insects most complained of are striped cucumber beetles, squash bugs, rose bugs, canker worms, cut worms and tent caterpillars, from 9 to 25 correspondents reporting the presence of each. Other insects mentioned are codling moths, currant worms, elm leaf beetles, cabbage worms, wire worms, horn flies, asparagus beetles, white grubs, brown tail moths, gypsy moths, onion maggots, the San José scale, the plum curculio, the pea vine louse and a small black flea beetle on potato vines.

Indian Corn.

Indian corn is generally reported as very small and backward for the season, owing to the cool weather of the month. There is little complaint of the stand or color, however, and with warm weather it will doubtless come forward rapidly. There is a notable increase in acreage this year, a 20 per cent increase seeming a conservative estimate for the State as a whole.

The Hay Crop.

Haying had hardly begun at the time of making returns except in south-eastern sections, where it was rather more advanced. By the date of issue it should be well under way in most sections. The crop will be short all over the State, although the reports indicate that it was much improved by the rains of the first half of the month. The rains were also of much benefit to grass roots, and it is not likely that mowings have suffered as much permanent injury as the short crop would ordinarily indicate.

Early Potatoes.

The acreage of early potatoes shows a slight increase for the State as a whole. The vines are reported as looking extra well; in fact, the June reports have seldom been so encouraging in this regard, although potatoes are perhaps a little backward at this time.

Early Market-garden Crops.

Early market-garden crops have generally done well and prices have perhaps ranged a little above the average. Asparagus was rather a light crop, but brought good prices. Later market-garden crops look well and promise good yields with favorable conditions.

Dairy Products.

Dairy products appear to be about normal as to quantity, with a general increase in price all along the line. Still, the increase is hardly proportionate to the increased price of grain, and the profits will not exceed, if, indeed, they equal, those of former years. Dairy cows are in good demand, at prices even higher than the high level maintained for the last few years.

Pasturage.

The rains of the month were of great benefit to pastures, which were generally reported as looking well, although there were a few complaints that the feed was still short, though green and growing.

Fruits and Berries.

Strawberries were late in ripening, but at the time of making returns picking was well under way in most sections, with the prospect of not more than a fair crop. Prices generally ranged high. Raspberries, blackberries and currants promise unusually well, with but few exceptions. Apples promise well in most sections, though Baldwins will not equal other varieties. Pears promise only a light crop. Cherries were rather light, but of good quality. Plums are reported to have set well and promise a good crop. Peaches now promise more than an average crop for this region. Wild berries set very heavily.

NOTES OF CORRESPONDENTS.

(Returned to us June 24.)

BERKSHIRE COUNTY.

New Marlborough (E. W. Rhoades). — Tent caterpillars, codling moths and a small black flea on potato vines are doing some damage. Indian corn is late planted and backward, but with an increased acreage. Haying has not begun, but there is the prospect of a full crop. More potatoes were planted than usual, and they are starting finely. Quantity of dairy products same as usual, but prices somewhat higher; few good milch cows for sale, and prices from $5 to $10 higher than usual. Pastures are in good condition. Cherries are scarce; apples well set.

Becket (Wm. H. Snow). — No insects are doing damage at present. Corn looks small and slim; acreage probably one-fourth greater than last year. Haying has not yet begun, and the prospect is that the crop will be light and late. The acreage of early potatoes is about the same as last year. Dairy products are fully up to the average in quantity and price. Pastures are in very good condition just at present, but have been short. The outlook for fruits and berries is quite good, as there was a full bloom and no frost to injure them.

Otis (S. H. Norton). — Insects are not very troublesome. Indian corn is very backward, with about the usual acreage. Haying has not begun, and the crop will be light. About the usual acreage of potatoes was planted, but they are backward. Dairy products are in about the usual quantity, with prices a little better; supply and price of dairy cows about average. Pasturage is not as good as last year. The apple crop will be very short in this locality; blackberries have made a full bloom.

Lee (A. Bradley). — The acreage of Indian corn is increased 5 per cent over last year, but the crop is at present a little off in condition. Haying has not begun, but the crop promises to be rather better than an average crop. The quantity of dairy products is about the same as usual, with a 5 per cent increase in their price. Pastures are in first-class condition. Apples will be about 85 per cent of a full crop.

Richmond (T. B. Salmon). — Potato bugs are doing some damage. Corn is backward, with about the usual acreage. Haying has not begun, but there will be about an average crop. Very few early potatoes are raised, but the acreage of late potatoes is greater than in previous years. The quantity and price of dairy products is about average, with dairy cows scarce and higher in price than formerly. Pastures are in good condition. Cherries killed by frost; strawberries, raspberries, blackberries and currants about average crops.

Hancock (C. H. Wells). — Striped squash bugs and currant worms are doing some damage. Indian corn is very small, and looks sickly, with a somewhat larger acreage than usual. Haying has not begun, but the prospect for the crop is good. The prices of dairy products are about the same as usual; very few sales of cows at any price. Pasturage is in good condition. Strawberries are almost a failure; no other small fruits raised to any extent.

Cheshire (L. J. Northup). — Potato bugs and tent caterpillars are doing some damage. Corn is very backward, not standing more than six inches high in the best fields. Haying will not commence for ten days. The acreage of early potatoes is above the average, and they promise a good crop. Early market-garden crops look well. The quantity and prices of dairy products compare favorably with former years; prices of cows increased. Pastures are in good condition. Strawberries are just coming into market, and will be a good crop.

Florida (E. D. Rice). — No insects worth mentioning as yet. Corn is quite backward, with the acreage 25 per cent greater than usual. None have commenced haying as yet; on good land the crop promises well. The acreage of early potatoes is about the same as usual, but the crop is backward. Dairy products bring a higher price than last year, and good cows command a high price. Berries are looking well, but there is such a large supply of wild berries that not many are gathered.

FRANKLIN COUNTY.

Monroe (D. H. Sherman). — A few potato bugs are the only insects doing damage. There is about the usual acreage of Indian corn, but it is late and small, the cold weather keeping it back. Haying has not begun, and there is general complaint that the crop will be light. The acreage of early potatoes is about normal, but it is too early to predict what the crop will be. The quantity of dairy products is above average, and the price about equal to former years. Pasturage is in good condition. Apples are look-

ing well, but are late; wild berries set full, and strawberries are beginning to ripen.

Bernardston (R. H. Cushman). — Cut worms have been very abundant, and potato bugs are doing some damage. Corn is late, but there is a very large acreage planted. Early pieces of grass have been cut, and a very light hay crop is in prospect. There is a full average acreage of potatoes, and they are looking well. Not so much butter, cream and milk are made as formerly, and cows are not plenty. Pastures have improved during the month. Apples will not be a heavy crop; all berries promise large crops.

Shelburne (G. E. Taylor). — Corn is looking fairly well, with the acreage perhaps larger than usual. Not much hay has been cut, and the prospect is for a short crop. The acreage of early potatoes is as great as in previous years, and they are looking well. Dairy products are higher than of late, with good prices for cows. Pasturage is short, but fresh; plenty, but with no surplus. Apples promise an average crop.

Ashfield (Charles Howes). — The weather is too cold for insects to work much. The acreage of Indian corn is greater than usual, but it is backward. Haying will not commence very much until next week, but there will be an average crop. The acreage of potatoes is greater than usual, and a good crop is promised. Dairy products are somewhat less in quantity than last year; cows not plenty, and higher in price. Pasturage is in good condition. Strawberries are a fair crop.

Whately (Frank Dickinson). — Cut worms are working in some fields. Indian corn is looking well, with an average acreage. Haying will begin this week, with less than an average crop. There is the usual acreage of early potatoes, and they promise well. Dairy products are high in price; dairy cows well up in price, and few to be had. Feed in pastures is short, but fresh and growing. There will be a full crop of fruits and berries.

Montague (C. S. Raymond). — Potato bugs and squash bugs are doing some damage. Corn is looking fairly well at present, but is small for the time of year. Haying has not begun, but there will be only a light crop. The acreage of early potatoes is somewhat larger than usual, and they promise well. Yield of early market-garden crops normal; prices about as usual. Quantity of dairy products above the average, and prices a trifle better; cows in good supply, at about the usual price. Pastures are not in very good condition. Strawberries are a light crop; currants promise well.

Northfield (T. R. Callender). — Potato bugs are just beginning to appear. Indian corn is backward; acreage about 25 per cent larger than usual. The hay crop will be much below the

average. The acreage of early potatoes is increased about 10 per cent, and the crop is looking unusually well. Cabbages are looking well; other market-garden stuff good. Quantity of dairy products about as usual, prices high; cows high and scarce. Pasturage is in good condition. The outlook for fruits and berries is fair.

Erving (Chas. F. Clark). — Potato bugs are doing some damage. Corn is backward, with about the usual acreage. Haying has begun, but the crop will not be a large one. The acreage of early potatoes is greater than usual, and the prospect for the crop is a good one. No market-garden crops marketed as yet; prospect good. The quantity and price of dairy products and the supply and price of dairy cows are about the same as usual. Pasturage is in good condition. There will be a medium apple crop.

New Salem (Daniel Ballard). — Currant worms and elm-leaf beetles are doing some damage. Corn is very backward, owing to cool weather; acreage greater than usual. Haying has not begun to any extent, and the prospects for the crop have increased very much of late. The acreage of early potatoes is about the same as usual, and they are looking well. The quantity of dairy products is about average, with prices higher; cows about the same as usual in price, beef cows a little higher. Pastures have improved very much during the frequent rains. There is a fair crop of strawberries, except where frost killed the bloom on low lands; blackberries bloomed full.

HAMPSHIRE COUNTY.

Enfield (D. O. Chickering). — Potato bugs promise to be very plenty. Indian corn is quite backward, and crows have been troublesome; acreage about as usual. Haying has not begun; the crop is late, but promises well. Acreage of early potatoes about the same as usual; they look well, and promise a heavy crop. Quantity of dairy products about the same as usual; prices rather better. Pastures are looking well at present. Strawberries are doing well; apples promise a heavy crop; cherries and plums will be a failure.

Belchertown (H. C. West). — Cut worms are doing some damage. The acreage of Indian corn is increased 40 per cent; a few fields are in fine condition, but it is generally very uneven. Very little haying has been done, and the prospect is for a light crop. Acreage of early potatoes 25 per cent greater than usual, and vines looking remarkably well. Early market-garden crops are rather late, with a fair yield and good prices. Dairy products are rather below in quantity, and correspondingly up in price. Pasturage is

short, and below the average in condition. All fruits and berries promise full average crops.

Amherst (Wm. P. Brooks). — Elm-leaf beetles are doing some damage; potato bugs very few. Corn is very backward, with a moderately increased acreage. Haying has begun to a very slight extent; new-seeded fields and timothy hay good crop, old fields light. Acreage of early potatoes about as usual, and promise for the crop unusually good. Quantity of dairy products a little short; price of butter high; cows of good quality few and dear. Pasturage is in good condition since the rains. Strawberries are yielding well; blackberries and currants promise well; peaches good; apples uneven, but on the whole quite good, Baldwins comparatively few; grapes look well; plums promise a fair crop.

Hadley (H. C. Russell). — Potato bugs and rose bugs are doing some damage. Indian corn is good, with about an average acreage. Not much haying has been done as yet. Early potatoes promise to be fully up to the average. Yield of market-garden crops fair and prices good. Dairy products are not increased in quantity, but bring higher prices than formerly. Pasturage is in good condition. The prospect is good for apples, pears and peaches; strawberries were damaged by frost, and are a light crop. All crops are looking well, considering the cool weather, tobacco especially having a good start.

Northampton (H. C. Comins). — Potato bugs are doing some damage. Corn is very backward, and many fields are small and yellow; acreage 20 per cent greater than last year. Haying has begun, with the prospect of a light crop on uplands. There is an increased acreage of early potatoes, and they are looking remarkably well. Most market-garden crops are late, and not yielding as well as usual; prices better than last year. Quantity of dairy products average, and prices higher than usual; price of cows about the same as last year. Pasturage is in excellent condition. Small fruits are promising well, except strawberries, which are not more than half a crop.

Westhampton (H. A. Parsons). — Potato bugs are doing some damage. Corn is in very good condition, but is late. Haying has begun, and the crop is nearly, though not quite, up to the average. The acreage of early potatoes is about the same as usual, and they are looking well. Not many early market-garden products have been harvested as yet, but they are looking well, though late. Dairy products bring higher prices than usual. Pastures are in good condition. Strawberries are not half a crop, but the outlook for high-bush blackberries is good.

Chesterfield (Horatio Bisbee). — Much more Indian corn was

planted than commonly, but it is looking poorly at present. Haying has not begun, and the prospect for the crop is not very good. Acreage of early potatoes about the same as usual, perhaps a little large, and they are looking well. The quantity and price of dairy products is well up; cows are scarce, and well up in price. Pasturage is in excellent condition. No fruits or berries grown for market in this locality.

Worthington (C. K. Brewster). — The acreage of corn is larger than usual, and it is backward on account of cold weather, but is looking fairly well. Haying has not begun, and the crop is backward and not very promising. The acreage of early potatoes is about the same as usual, and they are looking well. Early market-garden crops are about average in yield, with prices strong and higher than usual. Dairy products are averaging higher in price than usual, and good cows bring good prices. Pasturage is in very good condition at present.

HAMPDEN COUNTY.

Chester (C. Z. Inzell). — Corn is not looking very well; acreage greater than last year. Haying has hardly begun, and there will be only a light crop. Potatoes are looking well, with the acreage greater than last year. Dairy products bring better prices than in former years with cows about the same as usual. Pasturage is in fair condition.

Tolland (E. M. Moore). — Indian corn is looking fairly well, with about double the acreage usually planted. Some will commence haying this week, with the prospect of a two-thirds crop. The quantity and price of dairy products are both on the gain; cows are in good demand, and bring higher prices than in former years. Pasturage is not quite up to the normal in condition. The outlook for fruits and berries is unusually good.

Russell (E. D. Parks). — Potato bugs, tent caterpillars and cut worms are doing some damage. Indian corn is looking fairly well, with an increased acreage. Haying has not begun, but there will be about an average crop, old lands being poor and new-seeded lands good. Potatoes are looking well, but not many early potatoes are grown in this section. Early market-garden crops are about as usual in yield and price, with good prospects for those not yet harvested. The quantity and price of dairy products are above the average, with cows scarce and high. Pastures are in very good condition since the June rains. Strawberries are just going to market; other fruits fair.

Agawam (J. G. Burt). — Potato bugs are doing some damage.

Indian corn is looking well, with about the same number of acres grown as last year. Haying has not begun, and the crop will be light. The acreage of early potatoes is about the same as last year, and they promise well. Early market-garden crops are about the same as last year in yield and price, with a good prospect for later ones. Prices for dairy products are better than in the past, and cows are higher. Pasturage is looking well. There will be a small yield of all kinds of fruit, but prices are better than usual.

Chicopee (R. W. Bemis). — Corn is looking well where properly cared for, and a good acreage is planted. Haying has begun, with the prospect of a good crop. There is quite a good acreage of early potatoes planted, and they are looking well. Yield and price of early market-garden crops fully up to former years, with prospect good for later ones. The quantity and price of dairy products is good so far this season, and good cows bring good prices. Pastures are looking well.

Ludlow (C. B. Bennett). — Rose bugs, potato bugs and cut worms are doing some damage. Corn is very backward, but of good color; acreage about one-fourth larger than usual. Very little haying has been done; new-seeded fields good, others very light, but growing. The acreage of early potatoes is about the same as usual, and the crop looks first class. The price of milk does not vary from former years; good cows are scarce at from $50 to $60. Pasturage is in good condition. Strawberries are a light crop; blackberries good; apples will be a good crop; no plums or cherries; pears few.

East Longmeadow (J. L. Davis). — No insects are causing marked injury. The acreage of Indian corn is increased one-fourth, and it is looking well, except in wet places. A few have begun haying, and the crop is uneven, new-seeded land being good and old poor. The acreage of early potatoes is about average, but the frost hurt early planted fields somewhat, and the cold, dry weather of May rotted seed. Milk is from one-fourth to one-half a cent higher than in former years; cows about the same as last year. Pastures are doing well. Strawberries are a good crop; peaches, pears and apples promise well.

Hampden (John N. Isham). — Potato bugs are doing some damage. Corn is starting slowly, but looking well, with a larger acreage than formerly. Haying has not begun in earnest, but will within a week, with prospect of a good crop. There is an increase in the acreage of early potatoes, and every prospect of a large crop, growth being very rapid. Quantity of dairy products about as usual, and prices slightly higher; supply of cows equal to the de-

mand, with good prices. Pasturage has been somewhat scanty, but is now growing fast and looking green. Cherries and strawberries are ripening fast, with good yields; prospect good for later fruits and berries, although apples and pears have been dropping fast of late.

Holland (Francis Wight). — Potato bugs and rose bugs are doing some damage. Corn is backward, on account of cool nights, with a larger acreage than last year. Haying has not begun, but the prospect is good for a fair crop, because of the late rains. There is a larger acreage of early potatoes planted this year than in previous years, and they are looking well. Quantity of dairy products about as usual, prices higher; dairy cows are scarce, and prices a little higher than usual. The feed in pastures is good, the late rains having helped it very much. The outlook for apples and peaches is fair; pears and plums not as good; a fair crop of berries may be expected.

WORCESTER COUNTY.

Dudley (J. J. Gilles). — All kinds of insects are with us, but none are as plentiful as usual. Indian corn is making a fair growth on light, dry land, but on land inclined to be moist it is decidedly backward. Haying proper has not commenced, and the indications are for a light crop. The acreage of potatoes is about the same as usual, with the condition very uneven as to forwardness. The yield of early market-garden crops is normal, and prices somewhat lower than usual. The price of milk at retail is the same as in former years; butter shows a 10 per cent increase; milch cows are from $5 to $10 higher than formerly. Pasturage is in good condition. Strawberries are half a crop, with a 25 per cent increase in price; blackberries promise an abundant crop; raspberries are rusting badly; early cherries were mostly gathered by the birds; peaches and apples promise a full crop; plums will be light; pears and grapes about average.

West Brookfield (L. H. Chamberlain). — Potato bugs are doing some damage. Corn is looking well, but is backward; acreage increased. Haying has not commenced, and the crop will be light. The acreage of early potatoes is considerably increased, and they are looking well. Market-garden crops are looking well, but none have been harvested. The price of dairy products is perhaps a little higher than in former years. Pastures are in good condition.

Oakham (Jesse Allen). — Tent caterpillars are doing some damage. Indian corn is very backward, but the acreage is larger than usual. Haying has not begun, and the crop will be light. The acreage of early potatoes is about the same as usual, and they

are looking finely. Market-garden crops are little raised. Dairy products are less in quantity, with better prices; cows scarce and high. Pasturage is looking well. Prospect good for wild berries; apples abundant; pears, plums and peaches scarce.

Petersham (S. B. Cook). — Striped squash bugs and potato bugs are doing some damage. The corn acreage is larger than last year, and it is of good color, though small. Haying has not begun, but the prospect is for a good crop. Acreage of early potatoes about as usual, and crop growing finely. Yield and price of market-garden crops about as usual, with good prospects for later ones. Quantity of dairy products fully up to former years, prices about the same; cows rather scarce and high. Pastures are in first-rate condition. The promise for all fruits except peaches and pears is excellent, and all berries bloomed abundantly.

Phillipston (A. D. Clifford). — Insects are not very numerous as yet. Indian corn is backward, but the acreage is rather larger than usual. Haying has not yet begun, but the prospect for the crop is fair. There is about an average acreage of early potatoes, which are looking well. Yield and price of early market-garden crops about average; early cabbages looking well. Dairy cows are scarce and high. Pasturage is in good condition. There are not many berries and fruits, excepting apples, grown in this vicinity.

Gardner (A. F. Johnson). — Indian corn is late, the growth being slow, because of cold nights; slight increase in acreage. No haying done yet; outlook for the crop fair. No changes in the acreage of early potatoes, and they are looking well. Early market-garden crops are about as usual in yield and price. There is no perceptible change in the quantity and price of dairy products. Pasturage is in good condition. There will be a fair crop of apples

Harvard (John S. Preston). — Tent caterpillars are more plentiful than for a long time. Corn is short and yellow, owing to the cool weather. Some are cutting a little hay, and the prospect is for a fair crop. There is about the usual acreage of early potatoes, and they are looking well. Early market-garden crops have not come on very well as yet; prices better than usual. The only dairy product in this locality is milk, and the price is better than in the past few years; good dairy cows are not very plenty, and the price is well up. Pastures are looking better than usual at this time. Fall apples are looking well; cherries, strawberries, raspberries and blackberries promise well.

Bolton (H. E. Babcock). — Potato bugs and tent caterpillars are very plenty. Corn is backward, owing to cold nights; acreage rather above the average. A few have commenced haying, with

the prospect for the crop rather below the average. More early potatoes than usual were planted, and they are looking well. Early market-garden crops are good, and prices higher than in previous years. Quantity and price of dairy products a little better than usual; a light supply of cows, at high prices. Pastures are in good condition. There will be an average bearing year crop of apples.

Sterling (H. S. Sawyer). — Potato bugs are doing some damage. Indian corn is looking fairly well, with about the usual acreage. Very little haying has been done as yet, with the prospect of a light crop. More potatoes are planted than in previous years, and the outlook for the crop is good. There is a short crop of asparagus, prices high; peas nearly ready. The price of dairy products is a little higher than a year ago; good dairy cows are also higher. Feed in pastures is short. Strawberries are not very plenty; raspberries badly winter-killed; blackberries in blossom.

Worcester (H. R. Kinney). — Squash bugs are attracting the most attention of any insect, but potato bugs are beginning to do damage. Corn is late and yellow, owing to the cold weather; more field corn planted than usual. Haying has begun only in a small way, and does not promise a heavy crop. There is about the usual acreage of early potatoes, and they are looking finely. Early market-garden crops have done well, but have sold low. Quality of dairy products good; prices above the average, but not as high as grain or hay. Pastures are in about average condition. Strawberries are giving a fair crop, at good prices; other small fruits look fair.

Auburn (Wm. Gilbert). — Squash bugs and fleas on potato vines are doing some damage. Indian corn is looking well, with four-fifths more planted than for many years. Very few have begun haying, and the crop is considerably below the average. The acreage of early potatoes is about normal, and the vines are looking well. There is a fair supply of milk, but the price is low, compared with the price of grain; new milch cows are scarce and high. Pastures are very short and dry. Strawberries are a good crop, and peaches look very promising.

Hopedale (Delano Patrick). — No insects are doing much damage. Corn is very backward, with the usual acreage. Haying has not begun, with the prospect of nearly an average crop. There is about the usual acreage of early potatoes, and they are in good condition. Quantity of dairy products and supply of dairy cows average, with prices higher than usual. Pastures are in rather less than average condition.

Uxbridge (Augustus Story). — Elm-leaf beetles and potato bugs are doing some damage. Indian corn is looking finely, with about

the usual acreage. Haying has not begun, but there is the prospect of a good crop. Early potatoes are looking well, with about an average acreage. Early market-garden crops are doing well. The quantity and price of dairy products is about the same as usual. Strawberries are just coming into the market.

Blackstone (O. F. Fuller). — Potato bugs and elm-leaf beetles are doing some damage. Corn is looking well, with an increased acreage. Haying has just commenced, and there will be a fair crop. There is about the usual acreage of early potatoes, and the vines are looking well. Market-garden crops are about as in former years in yield and price. Dairy cows are a little higher than in former years; milk has been short ever since last fall. Pasturage is in good condition. There will not be a large crop of fruit, as the late frosts damaged the bloom; few strawberries are raised in town.

MIDDLESEX COUNTY.

Sherborn (N. B. Douglas). — Potato bugs are doing some damage. There is a poor stand of Indian corn, but the acreage is considerably increased. Very little hay has been cut, but there will be almost two-thirds of a full crop. There seems to be an increase in acreage of early potatoes, and they never promised better. Cows are doing fairly well, and are scarce and very high. Pastures are short, though recent rains have helped them. Apples, except Baldwins, promise a full crop; peaches look well; very few pears; outlook for grapes good; strawberries a fair crop, and good in some cases. The increased price of dairy products does not nearly equal the increased cost of grain.

Marlborough (E. D. Howe). — Potato bugs and striped squash bugs are the most prevalent insects. Indian corn is backward, and much silage corn is yet to be planted; acreage increased. Orchard grass and June grass are being cut between showers. There is an increase of perhaps 10 per cent in the acreage of potatoes, due to numerous small garden patches; crop prospects good. No marked changes in the yield and price of early market-garden crops. Milk flush, retail price fixed, cows very dear. Pasturage is in normal condition. Strawberries fair supply, prices higher than usual; cherries not abundant.

Maynard (L. H. Maynard). — Asparagus beetles, cut worms and the usual numbers of potato bugs are doing some damage. Indian corn looks well, but is late, owing to cold weather and heavy rains; acreage about average. Some are haying in orchards, etc.; prospect good for an average crop. The acreage of early potatoes is about the same as in former years, and the

crop is looking finely at this time. Market-garden crops compare well with former years in yield and price; those not harvested promise well. Dairy products rule a little higher than in former years; dairy cows are reasonable in price, but good ones are hard to find. Pastures are looking unusually well, owing to heavy rains. Strawberries are late, but the crop is good; blackberries and raspberries promise a full crop; apples 60 per cent of a full crop.

Littleton (Geo. W. Sanderson). — Canker worms are doing some damage. Indian corn is looking well; one-fourth larger acreage than usual, and one-third larger acreage for the silo. Haying has only just begun, and the prospect has improved during the past week, although the crop will be light on old fields. The acreage of early potatoes is larger than last year, and the crop promises well. What early market-garden crops there are compare favorably in yield and price with former years. There is a good demand for all dairy products, with fair prices; a better demand for cows, with prices averaging about the same as last year. Pasturage is in good condition. Strawberries are fine in quality, and blackberries and raspberries are looking fairly well.

Dunstable (A. J. Gilson). — Corn is looking well, with an acreage above the average. Haying has not commenced, and the prospect is that the crop will be light. The acreage of potatoes is about the same as usual, with a promising outlook. The quantity and price of dairy products are about the same as in former years; dairy cows are not plenty, and high in price. Pastures are improving since the late rains. The outlook for fruits and berries for early marketing is poor.

Westford (J. W. Fletcher). — Potato bugs are doing some damage. Corn is rather backward, but the acreage is increased. Haying has not begun, and there will be about an average crop. The acreage of early potatoes is rather smaller than usual, but the crop promises to be a good one. Pasturage is in good condition. Summer and fall apples are abundant, winter apples scarce; all kinds of berries are doing well.

Concord (Wm. H. Hunt). — There seem to be fewer asparagus beetles than usual, but otherwise we have the usual stock of insects. Corn is looking well, and there is more planted than usual. Haying has hardly begun as yet, and the crop is small, though late rains have helped it. Rather more early potatoes than usual were planted, and they are looking well. Asparagus is a short crop, but brings a high price; berries are selling well, but are a short crop. Dairy products bring a little higher prices than in former years. Pastures are in fair condition. Apples promise a fair crop; pears set light; peaches promise a full crop; strawberries are a fair crop.

Bedford (Henry Wood). — Canker worms, tent caterpillars and potato bugs are doing some damage. Indian corn is looking fairly well, with about the usual acreage. Haying has just begun, with the prospect of a poor crop. The acreage of early potatoes is about the same as usual, and they now promise well. Cows are high, and the price of dairy products is somewhat better than in former years. Pasturage is in very fine condition. Strawberries are yielding well, and bring good prices; blackberries good; very few pears; some peaches; too early to estimate as to apples.

Winchester (S. S. Symmes). — Gypsy moths are our worst insect. Indian corn is not raised here. Haying has begun, with about half a normal crop. The acreage of early potatoes is about half that of former years, but the vines look well. Peas are a short crop; prices good on all market-garden crops. Pasturage is short, and badly dried up. Strawberries are a very short crop; blackberries and raspberries promise well; rhubarb stopped growing in May, some fields being pulled once only. The strong winds prevailing for the past four weeks have injured tomatoes and many other garden crops. Recent rains are making things look better.

Arlington (W. W. Rawson). — White grubs are doing some damage. Haying has begun, with a light crop. Early market-garden crops are yielding well; prices average better than last season; prospects good for those crops not yet harvested.

Newton (Otis Pettee). — Potato bugs are active. Indian corn is looking very well, but is a little backward. Haying is just commencing, with the probability of a light crop. There are no marked changes in the acreage of early potatoes, and they are looking well. Pasturage has been rather light, but is now improving a little since the rains. Apples and pears promise good crops.

ESSEX COUNTY.

Salisbury (Wesley Pettengill). — Indian corn is small and backward, the weather being too cold; but the acreage is twice that of previous years. Haying has not begun, and there will be rather a light crop. The acreage of early potatoes is somewhat larger than usual, and they are looking well at the present time. Quantity of dairy products about as usual, and prices higher; price of cows higher than formerly, but no scarcity. Pastures are rather poor, especially on high ground. Strawberries are a fair crop; peaches promise a great crop; pears light; plums fair; apples not more than half a full crop.

Newbury (Geo. W. Adams). — Canker worms are doing some damage. Corn is backward, with the acreage slightly increased,

perhaps 5 per cent. A little weedy hay has been cut, and the crop will be very light. There is a slight increase in the acreage of early potatoes, and they promise a fair to good crop. Early market-garden crops are about average as regards yield and price. Quantity of dairy products exceeds the demand, and prices have not advanced. Pasturage is growing better, but has been exceedingly poor. Apples promise about one-third of a crop; pears fair; strawberries nearly an average crop.

Methuen (Asa L. Harris). — Canker worms are doing some damage. Corn has suffered from the late frosts, and, although up with the average year, is not doing well. Haying has not begun, and a poor crop is expected. Potatoes grow well, and will be in market early. The market is flooded with early market-garden crops, and prices are low. The price of milk is firm, with a supply to meet the demand. Pastures are in good condition, and will be as long as the rains continue. Strawberries are all the small fruit I see in the market, and are a fine crop.

Ipswich (O. C. Smith). — Rose bugs and tent caterpillars are doing some damage. Corn is growing well, with about a ten per cent increase in acreage. Hay is being cut, and the crop is below the average, owing to the small amount of rain. There is a full average acreage of early potatoes, and the vines are now in blossom and promise a good crop. The yield for early market-garden crops is good, and prices somewhat higher than usual; later crops promise well. Quantity of dairy products about as usual, with prices advanced 10 per cent or more; prices asked for cows generally higher. Pastures have been rather poor, but the late rains have caused much improvement. Apples, grapes, cherries and berries promise a good crop, except Baldwin apples, which did not bloom full.

Wenham (N. P. Perkins). — Canker worms, squash bugs, onion maggots and cabbage worms are doing some damage. Not much corn is planted in this vicinity, but what there is is looking well. Haying has just begun, with a poor crop on light land and a good one, though not equal to last year, on well-manured land. The acreage of early potatoes is much the same as usual, and as a rule the crop is looking well. The price of milk is a little better than last year; cows high and hard to get; fat cows also bring good prices. Pastures were getting quite short, but the recent rains have improved them somewhat. Strawberries are not a full crop; other berries looking well.

Manchester (John Baker). — Striped squash bugs, potato bugs and cut worms are doing some damage. Indian corn looks very well indeed, with about the same acreage as last year. Haying

has begun, with the prospect of a small crop. The acreage of early potatoes is about the same as usual, and they look well. Early market-garden crops are yielding well, with a little better prices than usual, and a good prospect for later ones. Quantity of dairy products the same as usual, prices higher; cows high in price and short in supply. Pasturage was beginning to be short, but recent rains have improved it. The prospect is good for strawberries, cranberries, raspberries, blackberries and currants.

NORFOLK COUNTY.

Avon (S. F. Oliver). — All kinds of corn are looking well. Haying will commence about June 25, and nearly all fields will yield an average crop, although some high lands are short. There is about the usual acreage of early potatoes, and they are looking the best for a number of years. Peas, radishes and lettuce are extra early, and bring good prices; later varieties also look well. Milk continues to be in good demand; supply of dairy cows good, and prices for good stock high. Pasturage is in good condition. Strawberries suffered from the early dry weather.

Stoughton (C. F. Curtis). — Elm-leaf beetles are doing some damage. Indian corn is looking finely, and the acreage will be 10 per cent more than usual. Haying has begun, and the prospect is for a two-thirds crop. Early potatoes are fully up to the average in acreage, and promise a good crop. Butter and milk bring higher prices than formerly, and good cows are scarce. Pasturage is poor owing to lack of rain in May and early June. Strawberries are only from one-third to one-half of a crop.

Canton (E. V. Kinsley). — Potato bugs are doing some damage. Corn is late, but is now looking well and growing fast; acreage twice as great as usual. Haying has begun, with a light crop, but not as light as was expected. More early potatoes than usual were planted, and they are now looking very well. Early market-garden crops look well, but none have been harvested as yet. Supply of milk has been short all the season, price per standard can two to four cents higher; dairy cows high and scarce. Pastures have been short, but are now looking finely from recent rains. The outlook for fruits and berries is very good, rains having now almost assured a good crop.

Walpole (E. L. Shepard). — Tent caterpillars and potato bugs are doing some damage. Indian corn is looking poorly, but the acreage is larger than common. Haying has begun with a light crop, but improving during the last few days. There is a larger acreage of potatoes than usual, and they are looking very well.

Yield of early market-garden crops light, on account of drought, prices about as usual; later crops promise to be light. Quantity of dairy products growing short, price a little higher for milk; cows short in supply and high in price. Pastures are in rather poor condition. Apples good; peaches and pears fair; strawberries fair; blueberries and blackberries good.

Norfolk (A. D. Towne). — Squash bugs, rose bugs and potato bugs are doing some damage. Corn is looking well, with the acreage about 50 per cent greater than last year. Haying has begun, and the crop will be light except on low, wet ground. Acreage of early potatoes about the same as usual, and they are looking remarkably well. Dairy products are a little higher than in former years, as are also cows, and good cows are not very plenty. Pasturage is improving since the recent rains. Strawberries are yielding well; blackberries and raspberries will give a good crop; plums, peaches and apples will yield heavily.

Medway (Monroe Morse). — Indian corn is looking nearly as well as usual, though some of it did not come up well; much more than usual being planted. Very little hay is yet cut, and the crop will be short. Potato vines are looking well. Pasturage is getting short. Pears will not be a full crop; peaches and apples full; strawberries good; raspberries and blackberries winter-killed.

BRISTOL COUNTY.

Easton (H. M. Thompson). — Potato bugs and cut worms are doing some damage. Indian corn is looking fairly well, the usual acreage having been planted. Haying is about commencing, with a little more than half a crop expected. The acreage of early potatoes is somewhat increased, and the crop is doing very well. Early market-garden crops are fully up to the standard, with later ones a trifle backward. Quantity and price of dairy products up to the average, with a possible slight increase; good dairy cows have been scarce, with prices well maintained. Pasturage has been poor, but is much freshened by the late rains. Pears are very light, but other fruit promises well.

Norton (Wm. A. Lane). — Potato bugs are doing some damage. Indian corn is looking well, with the acreage about a third greater than last year. Haying has not begun, and the crop will be light. The acreage of early potatoes is about the same as usual, with good prospects for the crop. Pastures are in very good condition. There is a good crop of strawberries, and they are selling fairly well.

Raynham (N. W. Shaw). — Potato bugs and rose bugs are doing some damage. Corn is looking well, with a smaller acreage

than in former years. Haying has hardly begun, and the crop will be light. The acreage of early potatoes is larger than usual, and they are looking well. Early market garden crops are yielding well and bringing good prices. Dairy products are higher in price than usual, and there is less dairy stock kept. Pastures are in good condition. Strawberries are nearly gone, and the crop was light; but few currants; raspberries and blackberries good.

Westport (A. S. Sherman). — Currant worms, potato bugs and striped squash bugs are doing some damage. Corn is looking very well, and more was planted this year than for many years. A few have begun haying, and there will be a fair crop, although injured by drought. Acreage of early potatoes about as in former years, with the promise of a small crop. Dairy products are about as usual, with cows scarce and high. Pasturage is in very good condition. Apples, grapes and peaches promise a good crop; pears almost a total failure.

Dartmouth (L. T. Davis). — Potato bugs and squash bugs are doing some damage. Indian corn looks quite well, but is rather small; acreage larger than usual, and perhaps nearly double. Haying is just beginning, and the crop will not be up to the average. There is no great increase in the acreage of early potatoes, but they are looking finely in most cases. Yield of early market-garden crops perhaps a little below some years; prices about average; later ones looking well. Prices of dairy products are about as usual, and dairy cows are scarce and high. Pasturage is fair since the rains. Strawberries suffered from drought; other small fruits look well.

Acushnet (M. S. Douglas). — Potato bugs and cut worms are doing some damage. It has been too cold for corn, and it is below average in condition; acreage very much larger than usual. Haying has begun with a two-thirds crop in prospect. The acreage of early potatoes is increased every year, and they now promise well. Prices on all market-garden crops are good, and they have yielded well. Prices for dairy products are good, and the quantity is up; dairy cows higher than in former years. Pasturage is in very good condition. Strawberries and raspberries will be a good crop, and currants promise well. Asparagus has been a rather poor crop, but the price was high.

PLYMOUTH COUNTY.

Brockton (Davis Copeland). — Striped squash bugs and cabbage worms are doing some damage. Indian corn is looking well, but is a little backward; more planted than usual by about 10 per cent. Haying has not begun, and the crop will be rather light,

except on low ground and under the best conditions. The acreage of early potatoes is about the same as usual, and there is every promise of a good crop. Yield of early market-garden crops light, and prices not quite up to former years. Milk is a little short, and prices are about the same as usual. Pastures are a little short, owing to dry weather. Strawberries are about an average crop, and the prospect for apples is good.

Marshfield (J. H. Bourne). — Potato bugs, squash bugs and tent caterpillars are doing some damage. Corn looks fairly well, although it did not come up as well as usual, and is a little backward; large acreage. Haying has begun, with the prospect of a small crop. There is a slightly increased acreage of early potatoes, and the promise is for an extra crop. Cows are doing well, with an increase in price of 20 per cent for milk over last year. Pastures are rather poor, and feed is short. Apples good; pears not average; peaches average; and strawberries less than average.

Pembroke (Nathaniel Morton). — Indian corn is hardly worth mentioning in this locality, but what there is looks very well. Haying has begun, with about half a crop. Acreage of early potatoes about the same as usual. Early market-garden crops are light, but later ones promise well. Prices for dairy products are higher than formerly. Pasturage is in very poor condition. Strawberries are a very good crop.

Plympton (Winthrop Fillebrown). — Tent caterpillars and potato bugs are doing some damage. Indian corn is backward, but is looking well; acreage increased over previous years. Haying has begun, and there is a prospect of about a two-thirds crop, as recent showers have improved it. There is an increased acreage of early potatoes, with the prospect of a large crop. Market-gardens are looking well, with prices fully equal to former years. Dairy products are about the same as usual, also prices; cows command higher prices. Pasturage is very fair. Blackberries, raspberries and currants bloomed full; strawberries have done remarkably well where not hurt by frost.

Bridgewater (Rowland Cass). — Cut worms, squash bugs and potato bugs are doing some damage. Corn is looking well, though late; acreage a third larger than last year. Haying has begun on light land, with about a two-thirds crop. The acreage of early potatoes is slightly increased, and the prospects for the crop are good. Early market-garden crops made about a normal yield, with good average prices. Quantity of dairy products below normal, prices slightly higher than usual; supply of dairy cows below the average, with prices higher. Pastures are in good condition. The yield of strawberries is better than usual.

Mattapoisett (E. C. Stetson). — Potato bugs, squash bugs and cut worms are doing some damage. The acreage of Indian corn is rather larger than usual, and it is looking well. Haying has begun, with a light crop. The acreage of early potatoes is about the same as usual, with good prospects for the crop. There is not much change in the yield and price of early market-garden crops. There is little change in the quantity and price of dairy products, and good cows are high. Strawberries, raspberries and currants are looking well.

BARNSTABLE COUNTY.

Bourne (D. D. Nye). — Scarcely any Indian corn has been planted this season. Haying has not begun, and the crop will not be more than one-half that of last year. There is the usual acreage of early potatoes, and they promise well. Early market-garden crops have done well in yield and price, and the prospect is good for later ones. Dairy cows are high, and the quantity and prices of dairy products are about as last year. Pastures look very well. Strawberries, raspberries, huckleberries and cranberries are looking well, with prospects of good crops.

Mashpee (W. F. Hammond). — Rose bugs, cut worms and fire worms are doing some damage. Corn is looking well, and is above the average in acreage. Haying has not begun, and it looks now as if there would be about half a crop. The acreage of early potatoes is above the average, and they promise well. Early market-garden crops are about the average in both yield and price. Dairy products are about the average in quantity, and prices are above the average. Pasturage is about average in condition. There will be average crops of strawberries, gooseberries and currants.

Brewster (T. D. Sears). — Potato bugs and squash bugs are doing some damage. Corn is looking well, with the acreage much the same as in previous years. Haying has begun, and there will not be more than half a crop. Acreage of early potatoes much the same as in previous years, and they are looking well. Dairy products average about the same as in past years. Pasturage is in poor condition, on account of drought. Blackberries and huckleberries blossomed well; strawberries yield well; apples look well; no pears.

Harwich (A. N. Doane). — Cranberry vine worms are doing some damage. Acreage of Indian corn about the same as usual, but it is not as forward as last year. Haying has not begun, and the prospect is for a poor crop. The acreage of early potatoes is less than last year, but they are looking well. Dairy products are

favorable in quantity and price. Pastures are in poor condition. The cranberry crop has been damaged by frost and fire worms. Strawberries have been a large crop, and brought good prices.

Eastham (J. A. Clark). — There is a larger acreage of Indian corn than usual, and it is looking well. Haying has begun on high land, and the crop will be fairly good on low ground. There is a larger acreage of early potatoes than usual, and they are looking fairly well. Cows bring higher prices than formerly, but dairy products are about the same in quantity and price. Pasturage has improved of late. Asparagus season is about over, with a light crop and good prices.

DUKES COUNTY.

West Tisbury (Geo. Hunt Luce). — Potato bugs are doing some damage. Indian corn has not done well, but the acreage is larger than usual. A few have cut some early hay, but most have not begun; prospect for about half a crop. The acreage of potatoes is about the same as usual, and an average crop is promised. Dairy products bring somewhat higher prices, and dairy cows are scarce. Pastures are in poor condition. Dry weather has injured strawberries.

NANTUCKET COUNTY.

Nantucket (Wallace Gardner). — The pea-vine louse is doing some damage. Corn is looking finely, with a greatly increased acreage. Some hay has been cut, and the crop will be fair. The acreage of early potatoes is about the same as usual, with the promise poor, owing to the rotting of the seed in the ground. All garden crops look finely, and prices compare well with other years. Butter is scarce and the price is up, milk the same; good cows scarce, and high in price. Pasturage is in good condition, recent heavy rains having started the feed in good shape. Strawberries are looking finely.

BULLETIN OF
MASSACHUSETTS BOARD OF AGRICULTURE.

THREE COMMON ORCHARD SCALES.*

By Prof. H. T. Fernald, *Professor of Entomology, Massachusetts Agricultural College.*

Our knowledge of scale insects has been very limited until recently. The injuries they cause have passed unnoticed in most cases, while the occasional loss of some tree has too often been attributed to some other cause. The appearance of the San José scale in Massachusetts, however, and its rapid extension over the State, followed everywhere by serious injury to the trees attacked, has attracted much attention to this group of insects.

Although over a hundred different kinds of scale insects probably occur in Massachusetts, only three are likely to be present in any orchard in sufficient abundance to cause injury to the trees and demand attention, and only one of these is usually so destructive as to require radical measures for its control. These three are the oyster-shell scale, the scurfy scale and the San José scale. It is important that every person having fruit trees should learn to recognize these three scales, and know what treatment to apply for each if he wishes to obtain his crops, or, in case of the San José scale, if he wishes even to keep his trees alive.

The Oyster-shell Scale.
(*Mytilaspis pomorum* Bouché.)

This scale is a native of Europe, and reached this country, where it is now generally distributed, about a hundred years ago. It is probably present in every orchard in Massachusetts in greater or less numbers, and is also abundant on many of our shade and forest trees.

During the winter the scales of this insect are very noticeable on the twigs and smaller branches of many trees, often completely covering them. The scale is about one-eighth of an inch long, quite pointed at one end, rounded at the other, and usually somewhat curved to one side (Fig. 1) so that in general outline it somewhat resembles an oyster shell. Its color is dark reddish

* Reprinted from Crop Report for May, 1901.

or grayish brown. If one of these scales be lifted, and its under side examined under a microscope, from twenty to a hundred whitish or yellowish eggs will be found, while under the pointed end are the remains of the parent insect which produced the scale.

The eggs hatch in Massachusetts about the 10th of June, the exact time varying with the nature of the season, and the little

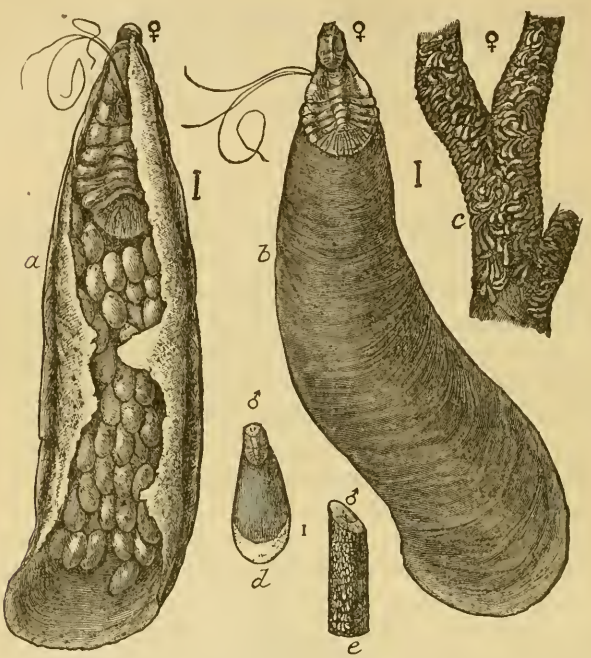

FIG. 1. — Oyster-shell scale: *a*, under side of female scale, showing eggs; *b*, upper side of same, both much enlarged; *c*, female scales on a branch, natural size; *d*, male scale, much enlarged; *e*, male scales on branch, natural size. The fine lines to the right of *a*, *b* and *d* show the real length of the scales. (Howard, U. S. Dept. Agr., Yearbook, 1894.)

yellowish young escape from under the scale and crawl about over the twigs, seeking for places to locate. After a few days they settle down, push their sharp beaks through the bark and begin to suck the sap from the tree. Here they remain, and gradually cover themselves with scales as a protection. In the fall the eggs are laid under the hinder part of the scale and the parent dies, leaving its scale as a covering during the winter for its eggs, which hatch the following spring. The male scales are smaller and of a slightly different form from the female scales, as shown in Fig. 1.

This insect is found on a large number of food plants, the more important ones being the apple, pear, plum, quince, lilac, ash, poplar, willow, elm, maple, raspberry, currant and rose.

The Scurfy Scale.

The San José Scale.

The Oyster-shell Scale.

THREE COMMON ORCHARD SCALES. — Twice Natural Size.

The Scurfy Scale.

(*Chionaspis furfura* Fitch.)

The scurfy scale, probably a native of this country, is generally abundant over the eastern United States, but is most plentiful south of New England.

The scale itself is somewhat smaller than that of the oyster-shell scale, and is usually broader in proportion to its length. One end is somewhat pointed, while the other is irregularly rounded, the general color being a dirty white, which makes it quite noticeable (Fig. 2, *a* and *c*).

The scales of the male (Fig. 2, *b* and *d*) differ from those of the female above described in form, and are also smaller.

The habits of this scale are similar to those of the oyster-shell scale, the winter being passed in the egg stage. The ten to seventy-five eggs which may be found under the female scale hatch in June, and the purplish young crawl about for a few days, after which they settle down to feed. The remainder of the life history is much the same as that of the oyster-shell scale.

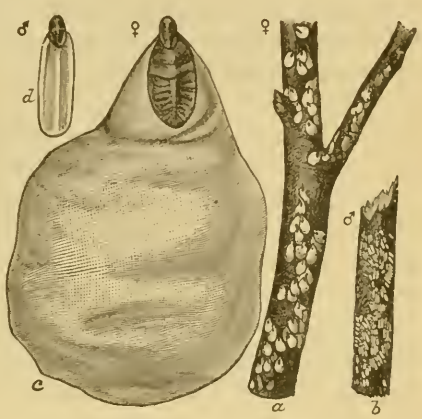

Fig. 2.—Scurfy scale: *a*, female, *b*, male scales natural size on twigs; *c*, female scales, much enlarged; *d*, male scale, much enlarged. (Howard, U. S. Dept. Agr., Yearbook, 1894.)

The scurfy scale is found on the apple, crab-apple, pear, peach, cherry, quince, Japan quince, currant, mountain ash and many other plants.

Treatment for the Oyster-shell and Scurfy Scales.

The treatment for these two scales is comparatively simple. As there is but one brood of young each year, the infested trees or plants should be sprayed soon after the young hatch from the egg; this will be some time in June, varying with the season. The material used for spraying may be either kerosene emulsion or a mechanical mixture of kerosene and water. If kerosene emulsion be used, it should be prepared as follows: hard soap, shaved fine, one-half pound; water, one gallon; kerosene, two gallons. Dissolve the soap in the water, which should be boiling; then remove

from the fire, and while hot pour it into the kerosene. Churn this with a spray pump till it changes, first into a creamy, then into a soft, butter-like mass. For use, take one part of this prepared emulsion and thoroughly mix with nine parts of soft water by churning it back into the pail, or whatever it may be in, through the spray pump until it is thoroughly mixed, then apply to the tree. This treatment in ordinary seasons should be made about the 15th of June, and a second one ten days or two weeks later.

If the mechanical mixture be used instead, a special pump, having two tanks, such as the "Kerowater," should be used, the pump being adjusted so as to mix five per cent of the kerosene with ninety-five per cent of water. The time of the treatments should be the same as when kerosene emulsion is used.

The San José Scale.

(*Aspidiotus perniciosus* Comst.)

This most serious of scale insects was first discovered in this country in California, about 1870. It is probable that China is its native home, and it has several times been received from there on imported stock. In 1893 it appeared in Virginia, where it seems to have been received from New Jersey. An investigation in the latter State led to the discovery that two nurseries there had about the year 1886 or 1887 introduced the "Kelsey" plum from California, in the hope that it might be proof against the attacks of the curculio. The trees thus obtained did not thrive (probably because they were infested by this scale), and were ultimately destroyed, but presumably not until the insect had spread from them to other nursery stock. As both of these nurseries did a large business, the scale was in this way scattered all over the eastern and middle States before the danger was realized. As many of the places to which the infested stock was sent were nurseries, these in turn became infested, with the result that the San José scale is now present in nearly every one of the United States, as well as in Canada and other foreign countries.

Life History.

The insect passes the winter under the scale, but it is probable that both the adult and the very young insects die during this period. In the spring those which are alive resume their feeding and become full grown about the first or middle of June. The production of young soon follows, these being born alive. When the young first appear they are extremely minute, yellowish in color, and with six legs. They crawl away from the parent scale and move about for a day or two, then settle down, and, inserting

their beaks into the bark, begin to suck the sap from the tree. About this time little waxy threads develop on the surface of the body, and soon fuse together to form the first portion of the covering scale. When this is completed the scale is white, nearly circular in outline, and with a little hump or nipple in the centre. About ten days later the insect molts its outer shell and adds this to the covering scale, which by this time has become dark gray, except the central nipple, which is lighter colored, often yellow. About ten days later the female insect molts again, and, as before, adds the molted skin to the covering scale, thus making it larger than those of the males, which do not undergo a second molt.

Soon after molting the second time the females become mature and begin to produce young, "averaging ten a day for more than a month." Each of these young develops as just described for the parent, and those produced first have begun to produce young in their turn before their parent has completed the same process.

As a result, young, crawling forms may be found at almost all times from the last of June until frosts appear in the fall, during which time it has been calculated that the progeny of a single female may number 1,608,040,200, all of which have obtained their nourishment from the plant they are on. With a power of increase as rapid as this, it is not strange that trees suffer severely and often die in a short time after being attacked by this pest.

Food Plants.

The San José scale feeds upon nearly all our plants, shrubs and trees, except evergreens. Its more usual food plants, however, appear to be the pear, peach, plum, cherry, strawberry, raspberry, blackberry, gooseberry, currant, grape, rose, osage orange, elm, maple, chestnut, oak, birch, willow and Japanese plants. It attacks trunk, branches, twigs, leaves, and even the fruit; and during the year 1900, currants, pears and apples, grown in Massachusetts, were received so covered by these insects as to render them unsalable.

Distribution in Massachusetts.

This scale was first discovered in Massachusetts in 1895. Since that time it has appeared in a large number of places in the State, probably introduced on stock purchased from infested nurseries, and it is now known to occur in the following places: Amherst, Arlington, Attleborough Falls, Auburndale, Bedford, Belchertown, Belmont, Beverly, Billerica, Boston, Brighton, Brockton, Brookline, Cambridge, Cambridgeport, Concord, Danvers, Dighton, Dracut, East Taunton, Everett, Fairfield, Fitchburg, Fram-

ingham, Greenwood, Groveland, Haverhill, Holyoke, Hudson, Jamaica Plain, Lancaster, Lawrence, Leominster, Lexington, Lunenburg, Lynn, Malden, Medford, Middleborough, Millis, Millville, Millwood, Natick, Newton, Newtonville, North Abington, Northampton, North Attleborough, North Cambridge, Norwood Central, Oakdale, Reading, Revere, Roslindale, Russell, Salem, Saxonville, Scituate, Somerville, South Framingham, South Chelmsford, Springfield, Swampscott, Taunton, Three Rivers, Townsend, West Newton, Winchester, Wollaston and Worcester. It is probable that in addition to these seventy places it is present in as many more, existing unrecognized and perhaps unnoticed.

How the Scale spreads.

The most important way in which the scale spreads is, as has already been shown, by its conveyance upon nursery stock. Its spread from tree to tree, however, occurs by means of the crawling young. These are very small, and may easily be blown off the tree they are on by sudden gusts of wind, and, if carried to another tree, or even very near it, may be able to establish themselves. Others crawl onto the feet of birds or even other insects as these rest on infested trees, and when they fly to other trees may crawl off there. If the branches of adjacent trees touch, the young may crawl directly from one to another.

Enemies.

The San José scale is not without its enemies, which prey upon it. Chief among these are the lady-birds, or lady-bugs, as they are commonly called, perhaps the most common one which feeds upon the scale being the "Twice-stabbed lady-bug," which is a small, shining black beetle, about an eighth of an inch long and nearly as wide, with its upper surface very strongly convex, and with two dark-red or orange spots on the back. This insect is of much aid in the destruction of the scale, but unfortunately its rate of increase is so much less than that of the scale that it is unable to do more than somewhat reduce the numbers of the pest.

There are several parasites of the scale as well, but, here, too, their rate of increase is less rapid than that of the scale, which of course renders their work of less value than would otherwise be the case.

A fungus occurs in the southern States which also attacks the scale, and this has been cultivated somewhat, in the hope that it might be made use of in controlling the insect. Thus far, however, these hopes have failed to be realized. In fact, all of these enemies together fail to do more than to somewhat check the

rapid increase of the scale, which, when present, requires treatment by man in addition, if the infested plants are to be kept from entire destruction.

Treatment.

The methods of treatment for the San José scale successfully used on the Pacific coast have thus far failed in the eastern United States, where they are "fatal to only a small percentage of scales." Why this is the case it is difficult to say. In California the treatment is applied some little time before the rainy season, which gives an opportunity for its action before being washed off by the rains. In the east, however, this treatment must be applied at times when rains are frequent, and it may be that in this fact is found the reason why the treatment is a failure in this part of the country.

The San José scale is a sucking insect; consequently, neither Paris green, arsenate of lead or any of the so-called "stomach poisons" are of the slightest use. The treatment which will kill it must be something which kills by coming in contact with it; and, as the insect, except in its earliest stages, is covered by a hard scale, the treatment must be by the application of some substance caustic enough to eat or corrode the scale and penetrate to the body of the insect beneath. Spraying with kerosene emulsion will kill the young insects, of course; but, as these appear every few days from some time in June until November or even December in some cases, this would mean that the infested trees must be sprayed at least once a week during this entire time, which is also the time during which it is most difficult to reach all parts of the tree thoroughly, on account of the foliage. Accordingly, treatment during the winter months is the best.

Destruction of Trees infested.

In cases where the scale has just appeared, or but few trees are infested, the cheapest and safest treatment is to cut down and burn those trees. If a tree be thoroughly covered with the scale, burning is also the best treatment, as it will be almost impossible to clear such a tree sufficiently to make it valuable for its product, while it would be a constant menace to all other trees around. The sooner a badly infested tree is destroyed the better.

Kerosene.

During the winter months, while the trees are not growing, much stronger materials can be used for treatment than during the growing season. This is particularly the case between the

first of January and the time when the buds begin to swell. During this period pure kerosene may be used under certain conditions with success. Kerosene will kill every scale which it touches, but, unless used in experienced hands, it is likely to kill the tree also, even during the late winter months, hence should be used with caution, and, as there are other and safer treatments, its use in general should be avoided. If it is desired to try it, however, the following suggestions should be closely followed: —

1. Use pure kerosene in January, February or March only.
2. Use the finest nozzle to the spray pump which can be obtained.
3. Stop spraying any portion as soon as it is wet.
4. Spray on a bright day, when a slight (not strong) breeze is blowing.

Crude Petroleum.

This substance has been recommended as an insecticide for scale insects by Dr. J. B. Smith of New Jersey, where it was first tried in 1898. While perhaps not beyond the experimental stage, as yet, it seems to promise well if precautions be followed in its use. Some of the conclusions drawn from experiments with it are: —

1. Treatment should be made in January, February or March.
2. Crude petroleum is not adapted to summer use.
3. It kills the scales wherever it comes in contact with them.
4. It may be used pure, but a more even distribution is obtained by mixing forty parts with sixty of water by means of a two-tank pump, such as the "Kerowater." Do not apply too much.
5. Use a very fine nozzle.
6. Spray on a reasonably calm day, when the trees are dry.
7. Use petroleum testing 43° Beaumé or above at 60° F. Petroleum testing lower than 43° at this temperature is dangerous to the trees.

In this last statement lies one of the chief difficulties. Crude petroleum is a very variable substance, and, if it be of too low a degree of the Beaumé scale, it is likely to injure the trees.

Fumigation.

While fumigation is the most certain method of destroying the scale, its use is not usually practicable by fruit growers in this State. Gas-tight tents, large enough to completely cover the trees, are necessary, and are expensive. The gas generated is a very dangerous one, and its use can hardly be recommended to one not familiar with it. It should be used for the treatment

of nursery stock before shipment, however, and so many nurseries in this country now have the scale that it is desirable that only fumigated stock be purchased.

Whale-oil Soap.

This is usually a fish-oil rather than a whale-oil soap. It should be liquid when cold even in as strong a mixture as two pounds to a gallon of water. If it contains fats other than the fish oil, it is likely to prove unsatisfactory, and it should therefore be obtained from a reliable manufacturer. Two satisfactory brands on the market are "Good's potash whale-oil soap No. 3," made by James Good of Philadelphia, and the "Anchor brand," made by Leggett & Bro., 301 Pearl Street, New York.

This soap should be dissolved in water at the rate of two pounds of soap to a gallon of water, by heat, and sprayed between the first of January and the time the buds open. If it is desirable to spray in the fall, this may be done after the leaves have fallen, using one pound to a gallon of water.

Treatment with whale-oil soap is probably the most practical for fruit growers to make use of in most cases.

Summary of Treatment.

1. Fumigation is the most effectual treatment known, but must be given under such conditions as to make it usually impracticable for general use by inexperienced persons.

2. Kerosene will kill the scale, and is likely to kill the trees as well. A strength of kerosene and water mixture which will not injure one kind of tree may kill another kind.

3. Crude petroleum may prove the best remedy to use, but must test above 43° Beaumé, and be used only in January, February or March.

4. The treatment recommended for general use, except in nurseries, is as follows: —

(*a*) Spray infested trees with whale-oil soap, two pounds to a gallon of water, before the buds start in the spring, or at the rate of one pound to a gallon of water, after the leaves are off in the fall.

(*b*) Cut back and prune infested trees before spraying, burning the prunings.

(*c*) Cover as much of the trunk and limbs with whitewash, about the first of June, as the tree will safely stand.

(*d*) Badly infested trees can probably never be entirely cleared, and, if left, will distribute the scale to all trees near by. Cut and burn all badly infested trees.

(*e*) In spraying for the scale, remember that, to be destroyed, each scale must be touched. Use a very fine nozzle, and try to reach every part of the tree, but stop spraying any part before it begins to drip.

5. Never purchase stock not accompanied by a certificate of inspection, signed by an authorized inspector, or by a guarantee that it has been fumigated with hydrocyanic acid gas. One who neglects this has only himself to blame if his trees prove later to have been infested.

SERIES OF 1902. BULLETIN NO. 3.

MASSACHUSETTS

CROP REPORT

FOR THE

MONTH OF JULY, 1902.

ISSUED BY

J. W. STOCKWELL

SECRETARY STATE BOARD OF AGRICULTURE.

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Crop Report for the Month of July, 1902.

Office of State Board of Agriculture,
Boston, Mass., Aug. 1, 1902.

Bulletin No. 3, Crop Report for the month of July, is herewith presented. Attention is called to the article at the close of the bulletin on "Beef Production in New England," by Prof. J. W. Sanborn. Professor Sanborn has been connected with the New Hampshire and Missouri agricultural colleges, and was formerly director of the Missouri Agricultural Experiment Station, president of the Utah Agricultural College and director of the Utah Agricultural Experiment Station. He is at present engaged in farming on a large scale at Gilmanton, N. H., and his wide experience in both New England and the west has rendered him particularly fitted to treat this important and timely subject, which deserves attention and study on the part of our farmers in these times of high-priced meat products.

Progress of the Season.

The July returns of the United States Department of Agriculture (Crop Reporter for July, 1902) state that the preliminary returns on the acreage of corn planted indicate an increase of about 3,520,000 acres, or 3.9 per cent on the area planted last year. The average condition of the growing crop July 1 was 87.5, as compared with 81.3 last year, 89.5 in 1900 and a ten-year average of 89.2.

The condition of winter wheat improved during June nine-tenths of one per cent, standing on July 1 at 77, or 11.3 points below the condition last year, 3.8 points below that in 1900 and 2.4 points below the ten-year average. The average condition of spring wheat declined 3 points during June, standing at 92.4 on July 1, as compared with 95.6 last year, 55.2 at the corresponding date in 1900 and a ten-year average of 85.8. The condition of spring and winter

wheat combined on July 1 was 82.9, as compared with 91.1 last year, 69.8 in 1900 and 76.2 in 1899. The amount of wheat remaining in the hands of the farmers on July 1 was estimated at about 52,440,000 bushels, or 7 per cent of the crop of last year.

The average condition of the oat crop was 92.1, as compared with 90.6 last month, 83.7 on July 1, 1901, 85.5 in 1900 and a ten-year average of 87.3.

The average condition of barley was 93.7, against 93.6 a month earlier, 91.3 last year, 76.3 in 1900 and a ten-year average of 87.1. In spite of the decline during June the condition in every important State was above the ten-year average.

The average condition of winter rye was 91.2, as compared with 93.6 last year, 89.6 in 1900 and a ten-year average of 89.2. Each of the principal rye-producing States showed an improvement during June. The average condition of spring rye was 89.3, as compared with 93.3 last year, 69.7 in 1900 and a ten-year average of 87.9.

The acreage of potatoes was 3.5 per cent, or about 100,000 acres, greater than that of last year. The average condition of potatoes on July 1 was 92.9, as compared with 87.4 last year, 91.3 in 1900 and a ten-year average of 92.3.

Reports on sweet potatoes were rather unfavorable, but few states showing conditions above their ten-year averages and the majority of the more important producing States showing conditions below such averages.

The acreage reported as under tobacco was considerably smaller than in 1901. Its average condition was generally below the ten-year average in the southern States and above in Ohio and Wisconsin.

Reports of the hay crop were very favorable, an improvement in condition being noted during June in nearly every important hay-producing State. The rains of the two preceding months were very beneficial to pastures and their condition July 1 was excellent, nearly every important State reporting a condition considerably above the ten-year average.

While there was a general decline in the condition of apples and peaches as compared with a month earlier, reports of

those fruits from almost every important State indicated that more than an average crop of each will be harvested. The condition of grapes was very good, and it is quite probable that the crop will be as large as that of any ordinarily good year.

The average condition of cotton on June 25 was 84.7, as compared with 95.1 on May 26 of this year, 81.1 on June 25 of last year, 75.8 on July 1, 1900, and a ten-year average of 85.6.

In Massachusetts the acreage of corn as compared with last year was 107, and the average condition July 1, 82; the average condition of oats, 98; the average condition of winter rye, 95; the average condition of spring rye, 100; the acreage of potatoes, 104, and the average condition, 100; the acreage of tobacco, 106, and the average condition, 88; the average condition of clover, 94; the average condition of timothy, 91; the average condition of pastures, 93; the average condition of apples, 90; the average condition of peaches, 86; and the average condition of grapes, 86.

Temperature and Rainfall for the Whole Country.

[From United States Climate and Crop Bulletins.]

Week ending June 30. — The week was decidedly cool in the districts from the Missouri valley to the New England coast, and averaged slightly cooler than usual over the western portion of the Plateau regions and generally throughout the northern Rocky Mountain districts. Along the Pacific coast and generally throughout the southern portions of the country the week was warmer than usual. The week was rainless over the greater part of the central and east Gulf districts, and in extreme western Texas, and only light showers occurred in the western part of the upper Lake region and the Red River valley. Generally throughout the central valleys, Lake region, New England and the Middle Atlantic States and from the lower Missouri valley southward to the Gulf coast the weekly rainfall largely exceeded the average, and in some districts was phenomenally heavy.

Week ending July 7. — The week averaged warmer than usual in the Southern States, in the lower Missouri, central Mississippi, Ohio and Red River valleys, over the greater

part of the Lake region and the Middle Atlantic States. In New England, the eastern portion of the lower Lake region, over portions of the upper Missouri and Mississippi valleys and generally throughout the Rocky Mountain and Pacific coast districts the week averaged cooler than usual. The rainfall during the week was very heavy in the lower Missouri and upper Mississippi valleys and Lake region, and more than the average amount fell in southern New England and over the greater part of the Middle Atlantic States. Except over limited areas in the Ohio valley and Southern States the week was dry and a large part of these districts received no appreciable amount.

Week ending July 14. — The week was cooler than usual on the north Pacific coast, throughout the Plateau districts, in lower Missouri, central Mississippi and Ohio valleys and in portions of the lower Lake region and Atlantic Coast States. The week averaged warmer than usual over the northern portion of the Lake region, in New England and in the central and east Gulf States. The South Atlantic States, local areas in the central Gulf districts, a considerable portion of Texas, the greater part of the lower Missouri valley and portions of the upper Mississippi valley and Lake region received more than the average amount of rain. There was also more than the average in the upper Missouri valley and over the southern portion of the Middle Atlantic States. Over most of the central Gulf districts, lower Mississippi and Ohio valleys, northern portion of the Middle Atlantic States, New England and northern portion of the Lake region there was less than the average amount.

Week ending July 21. — The week was warmer than usual in the Middle, South Atlantic and east Gulf States, in the Ohio and lower Mississippi valleys and over limited areas in extreme northeastern New England. Throughout the Plateau region and eastern Rocky Mountain slope, including the upper Missouri valley and the greater part of the Lake region and New England, the week averaged cooler than usual. The States of the lower Missouri, upper Mississippi and Ohio valleys, the Lake region and northern New England continued to receive heavy rains, the heaviest occurring in the upper Mississippi and Missouri valleys. Local areas in the

Southern States have also received generous rains, but over the greater part of the central and east Gulf States the rainfall was below the average, no appreciable amount being reported over considerable areas. The weekly rainfall in the Middle Atlantic States was also below the average.

Special Telegraphic Reports.

[Weather Bureau, Boston.]

Week ending June 30. — New England. Boston: Cloudy and cool, unfavorable for crop growth; general rains, too heavy in north, but beneficial in south; corn and gardens backward; tobacco fair, making slow growth; potatoes good; haying progressing slowly, fair crop; apples, pears and berries promise good crops.

Week ending July 7. — New England. Boston: Weather generally favorable, but too cool for rapid growth; harvesting and curing hay hindered by showers and crop below average; potatoes fine; tobacco excellent; gardens growing slowly; corn probably partial failure; apples and berries good crops; peaches and pears fair, but uneven.

Week ending July 14. — New England. Boston: Weather very favorable; best week of season; all crops made rapid growth and are in good condition; corn still backward, but much improved; potatoes and tobacco excellent; apples good; peaches, pears and plums fair; all berries good; fair progress with haying, yield good.

Week ending July 21. — New England. Boston: Weather generally favorable for growth of crops; showers retarded cultivation and harvesting; grain good; corn backward; potatoes excellent; tobacco excellent, but considerably damaged by hail in some fields; apples, peaches and berries good; pears below average; good garden crops; sunshine needed.

Weather of July, 1902.

The weather of the first week was made up of alternate showers and sunshine. The rainfall was seasonal and not in excess, but, owing to the uniformly low temperature, more sunshine was needed. The average temperature at Boston for the week ending July 6 for 30 years is 72.1, while the mean for the week, 1902, was 64.6, or 7.5 degrees below

the average or normal for the first week of the month. The week ending the 14th was somewhat changeable, but, on the whole, a decided improvement on the preceding one. The weather was generally fair with a larger per cent of sunshine and a corresponding increase in the temperature. The normal temperature for the second week of July, at Boston, for 30 years is 72 degrees. The mean for the corresponding week of 1902 was 71.7 degrees, which was practically normal. Notwithstanding the normal temperature there was a general complaint of cool nights. From the 15th to 22d the weather was quite seasonal, there being a fair amount of sunshine with increased warmth in the atmosphere. The temperature was somewhat below the weekly normal, but the departure was unimportant. The closing week of the month was exceptionally unfavorable. The skies were almost continuously overcast, with frequent light rains and showers. The winds were easterly with more or less fog. The temperature, owing to cloudiness and ocean winds, was low, the mean being between three and four degrees below the normal for the last seven days of July. The month as a whole was abnormally cool, with a superabundance of cloudiness and damp easterly winds, and much unpleasant weather.

In the circular to correspondents returnable July 23 the following questions were asked : —

1. What insects are proving most troublesome in your locality?

2. What is the condition of Indian corn, and what proportion of the crop will be put into the silo?

3. What is the quantity and quality of the hay crop as compared with former years?

4. What forage crops are being raised to supplement the hay crop, for the silo, and to eke out the pastures; what is their condition, and are more raised than usual?

5. What is the condition of market-garden crops, including potatoes, and how have those already harvested compared in yield and price with former years?

6. What is the prospect for apples, pears, peaches, plums, quinces, grapes and cranberries?

7. What is the condition of pasturage in your locality?

8. How have rye, oats and barley compared with former years, both as grain and forage crops?

Returns have been received from 164 correspondents, and from them the following summary has been made up: —

Insects.

Much less than the usual amount of damage is reported from insects. Potato bugs are most numerous, but even they have been decidedly less injurious than usual, some correspondents reporting them so scarce that no repressive measures have been necessary. Other insects mentioned are squash bugs, elm leaf beetles, cut worms, striped cucumber beetles, currant worms, tent caterpillars, canker worms, white grubs, onion maggots, curculios, cranberry vine worms, borers, horn flies, rose bugs and gypsy moth caterpillars.

Indian Corn.

The wet weather and cold nights have retarded the growth of Indian corn and it is badly in need of warm, growing weather. It is fully two weeks late and perhaps more in western sections, and continued cool weather will mean at least a partial failure for the crop. In eastern counties it is somewhat more advanced. Silos continue to gain in favor and more corn is used for ensilage each year.

The Hay Crop.

The excess of rainy weather made haying progress very slowly and at the time of making returns much remained to be done, especially in western sections, where haying was, on the whole, not more than half completed. The rains improved the quantity of the crop so that it was close to average in western sections. In the eastern counties, where cutting was generally earlier, it was probably not over a two-thirds crop. The quality of the crop was generally good, although many fields should have been cut earlier for best results in this respect. Much hay was caught out and badly damaged in the frequent rains.

Forage Crops.

Fodder corn is the forage crop most extensively raised, although it is closely pressed by the millets, Japanese millet being the favorite. Oats, Hungarian grass and barley follow in the order named. Other forage crops mentioned are oats and peas, rye, peas, turnips, cabbage and buckwheat. Rather more of these crops than usual have been planted and they are in excellent condition.

Market-garden Crops.

The frequent rains have kept market-garden crops growing well, and with warmer weather excellent results are promised. Prices have apparently averaged better than usual.

Early Potatoes.

At the time of making returns very few early potatoes had been dug, but almost all correspondents unite in reporting the prospects for the crop to be excellent. There were a very few reports of blight, but not enough to affect the crop materially unless it becomes more prevalent. Prices have been well sustained.

Fruits.

Apples continue to promise well, though the crop will not be a record one. Pears promise to be even a smaller crop than has heretofore been anticipated. Peaches promise a fair crop, perhaps above the average for this climate. Plums will be a fair crop, but not a heavy one. Quinces are good as far as reported. Grapes set very heavily. Cranberries appear to have set well, so far as reported.

Pasturage.

The frequent rains have kept feed in pastures growing well, and in most sections they were never in better condition at this time of year.

Small Grains.

Rye, oats and barley have generally done well. Oats and barley, especially the latter, are little grown except for forage, but promise well in that capacity.

NOTES OF CORRESPONDENTS.

(Returned to us July 23.)

BERKSHIRE COUNTY.

Sheffield (Dwight Andrews). — Potato bugs are doing some damage. Indian corn is looking well, but is late; nearly two-thirds of it will go into the silo. The hay crop was a full average in both quality and quantity. Corn is our main reliance as a forage crop. Market-garden crops, including potatoes, are fairly good, but late, with full average prices. Apples will be a light crop and there are not many pears. Rye is not an average crop; oats look well, but show some rust owing to wet weather.

Alford (L. T. Osborne). — Potato bugs are doing some damage. Indian corn is at least ten days late. Hay is an average crop, but little of it has been cut and the quality is much damaged by the rains. Sowed corn is our principal forage crop and is in fair condition, but backward; more raised than usual. Market-garden crops are backward and potatoes are making a light yield. There will be an average crop of apples. Pasturage is much above the average in condition. Rye, oats and barley are average crops.

Tyringham (E. H. Slater). — Potato bugs have not been as numerous as usual. Corn is very backward; about one-fourth of the crop will be put into the silo. The hay crop is of good quality, but no larger than in previous years and the recent rains will make haying very late. Corn and Japanese millet are raised to supplement the hay crop and for fodder. Potatoes are looking well, but very few have been dug as yet. There are very few apples in this valley, but they are plenty on the uplands. Pastures are looking well. Rye and oats are looking well, both as grain and forage crops.

Hinsdale (Thos. F. Barker). — Potato bugs are doing some damage. Corn is backward, but with a favorable fall we should have a fair crop; but little will be put into the silo. The hay crop is much better than for three years, both in quantity and quality, but haying is slow work as it has rained every day but two for two weeks. Japanese millet, rye and oats are our principal forage crops. Market-garden crops are backward; potatoes

better than last year, with prices about average. Apples and pears promise well; few grapes and cranberries. There is good feed in all pastures. Rye, oats and barley are backward, yet will be about average crops.

Peru (F. G. Creamer). — Potato bugs are doing some damage. Indian corn is a very poor crop; nearly all of it is destined for the silo. Hay is a very good crop with the quality above the average. Potatoes are looking well, none harvested as yet. Apples are looking well, and are about the only fruit raised for market. Pastures are in very good condition. Rye, oats and barley are about normal crops.

Dalton (Wesley B. Barton). — Corn is very backward and all will go into the silo unless it develops very fast. Hay is of fair quality but the weather has been very unfavorable for securing it. Japanese millet, peas and oats, and barley are our principal forage crops. Potatoes look well but are late. Apples and pears will be about half crops, but plums promise a fair crop. There is a good growth of feed in pastures, but there seems to be little milk in it. Rye, oats and barley are good crops but are suffering from too much rain.

Windsor (H. A. Ford). — There are but very few potato bugs this year. Indian corn is very small; about one-third of the crop will go into the silo. The quality of the hay crop is good and the quantity 75 per cent of the average. Oats, corn and millet are our principal forage crops. Potatoes are looking finely and some of them are ready to dig. There will be a great crop of apples; no other fruits raised. Pasturage is in fine condition. It is too early to report on oats, rye and barley.

Hancock (C. H. Wells). — Striped cucumber beetles are doing some damage. Corn is very small and no ensilage corn is raised. It has rained almost every day during July and a part of June, so that our farmers are much discouraged in trying to secure the good hay crop. Potatoes begin to show signs of blight. Apples will be a light crop and other fruits are almost a failure. Pastures are in fine condition. Oats promise well.

FRANKLIN COUNTY.

Rowe (J. F. Brown). — Corn is very small and backward and the crop must nearly all be put into the silo. The hay crop is an average one in quantity and quality and but little has been cut as yet. Millet and corn are our principal forage crops and more are raised than usual. Potatoes are looking finely, but none have been harvested as yet. The prospect for apples is good. Pastur-

age is above the average in condition. Oats are looking very well, never better; rye and barley not raised to any extent.

Colrain (A. A. Smith). — Squash bugs and cut worms are doing some damage. Indian corn is in very poor condition and two-thirds of the crop will be put into the silo. The hay crop shows an increase in quantity, but the quality is poor because of poor weather to secure it. Fodder corn, and Hungarian grass are our principal forage crops and are in good condition. Market-garden crops, including potatoes, promise well with an increased acreage. The prospect for the fruit crop is good at the present time. Pasturage was never better. Rye, oats and barley are fully up to the average.

Leyden (U. T. Darling). — Potato bugs are doing some damage. Indian corn is about two weeks late on account of cold, wet weather; one-fourth of the crop will be put into the silo. The hay crop was rather better than was expected; about a three-fourths crop. Oats and corn are our principal forage crops. Potatoes are looking well with good prices. The prospect for apples and pears is good; other fruits light. Pastures are in good condition. Rye, oats and barley promise to be more than average crops.

Gill (F. F. Stoughton). — Indian corn is very late. The hay crop is lighter than usual. Corn for the silo, and barley, oats and corn are our principal forage crops. Potatoes promise well. Apples will be a good crop. Pasturage is in very good condition. Rye, oats and barley are better than usual, both as grain and forage crops.

Deerfield (Chas. Jones). — There are fewer potato bugs than usual. Corn is small and not looking as well as in former years. The hay crop was a good average in quantity, but there has been so much rain that the quality will be poor. Market-garden crops are looking well; potatoes never looked better. Apples, plums and grapes are looking well; very few pears and peaches. Pastures are in good condition. Rye is a good average crop and oats are an extra crop. Tobacco is a little late, but is even and growing well.

Sunderland (J. M. J. Legate). — The potato bug is the only insect doing any damage and it is not as prevalent as usual. Corn is very backward and it looks as if there would not be more than half a crop; two-thirds of the crop was intended for the silo when planted. The hay crop will be above the average if it can be secured; most of that cut has been wet before going into the barn. Corn is the only forage crop raised. Market-garden crops are very backward; potatoes are looking well, but there have been

few harvested. There will be a fair crop of apples and plums and grapes are heavily set. There is plenty of feed in the pastures, but owing to excess of moisture it is not very nourishing.

Northfield (T. R. Callendar). Potato bugs are fewer than for many years. Indian corn is very backward, certainly three weeks behind the average; not over 5 per cent of the crop will go into the silo. The hay crop is below the average in both quantity and quality. Corn and oats, with a small amount of barley, are raised to help out the pastures; oats and barley are looking well. Potatoes give promise of an unusual yield except on low ground. Apples will be about an average crop and peaches promise a good yield. Pasturage is in good condition. Grain crops are all above the average both as grain and forage.

New Salem (Daniel Ballard). — Little trouble from insects. Corn is very backward; only a small proportion will go into the silo. Hay has improved of late and will be about an average crop. Peas and oats, Hungarian grass and fodder corn are our principal forage crops; more are raised than usual, fodder corn backward. Potatoes are looking finely but few have been dug as yet. Apples are abundant; few pears, peaches and plums; prospect for grapes good. Pastures are fresh and growing. Rye, oats and barley are fair average crops.

HAMPSHIRE COUNTY.

Greenwich (Wm. S. Douglas). — Potato bugs are doing some damage. Indian corn is backward. The hay crop is light in quantity, but of fair quality. Oats are our principal forage crop and are in good condition. Market-garden crops are in good condition and potatoes promise well. There is not much prospect of a good fruit crop. Pastures are in good condition.

Belchertown (H. C. West). — Potato bugs are doing some damage. Corn is in fairly good condition; very little will go into the silo. The long spell of wet weather has brought the hay crop up to a full average. Fodder corn, oats, millet and barley are our principal forage crops and all are coming forward fairly well. Market-garden crops are a full average; early potatoes fine, prices a little low. Pasturage is short. Apples and peaches average; pears fair; no plums; grapes good; few quinces. Rye, oats and barley are full average crops.

Amherst (Wm. P. Brooks). — Potato bugs fewer than usual; onion maggots and elm leaf beetles also doing damage. Indian corn is very backward, except on light lands; about half the crop goes into the silo. Hay made a heavy yield on all good fields;

harvest late on account of wet weather and much damage from the same cause. Japanese barnyard millet, Hungarian grass, oats, peas and rye are our principal forage crops; condition good; acreage no more than usual. Potatoes are in unusually good condition, but few have been dug; other market-garden crops look well. Apples, except Baldwins, promise a full crop; pears little grown; peaches a good crop; plums fair; grapes promise well. Pastures are in unusually good condition. Rye is a good crop and oats look well. Clear and hot weather is much needed. Tobacco looks well. Onions promise well where stand is full.

Southampton (C. B. Lyman). — Not much trouble with insects other than potato bugs. Indian corn is looking very well but is late. The hay crop is about average in quantity and of good quality. Corn and millet are our principal forage crops; rather more than usual planted and condition fair. Market-garden crops in good condition; potatoes looking extra well but few dug as yet. Apples and pears fair; grapes plenty; peaches and quinces few. Pastures continue in good condition. Rye good, oats extra and no barley raised.

Williamsburg (F. C. Richards). — Potato bugs are doing some damage. Corn is backward but is coming on well now; about one-third of the crop will go into the silo. Oats and Hungarian grass are our principal forage crops and they are in average condition. Market-garden crops late but looking well; potatoes fine. Winter apples never promised finer quality, good size, free from worms and promise to color up well. Pears half a crop; peaches 90 per cent; plums a full crop. Pasturage holds good.

Goshen (Alvin Barrus). — Indian corn is generally late or backward; one-half the crop will go into the silo. The hay crop was of light quantity but fair quality. Corn is our principal forage crop. No potatoes dug yet; few or no market-garden crops raised. Most fruits promise well. Pasturage is in excellent condition, but pastures are lightly stocked as a rule. Rye, oats and barley are rather below medium crops.

Huntington (H. W. Stickney). — Corn is backward. The hay crop is better than it promised to be ten days ago, but there has been so much rain that it has been almost impossible to make good hay. Corn is our principal forage crop. The prospect was never better for potatoes and garden crops. The prospect for the fruit crop is better than usual and many apple trees need to be propped up. Pasturage is in good condition. Rye, oats and barley are fully as good as usual.

Middlefield (J. T. Bryan). — Very little damage from insects. Indian corn is very small and backward and little of it will ripen;

half the crop will be put into the silo. The hay crop is a full average in quantity and of good quality. Oats, barley, Hungarian grass and millet are our principal forage crops. Garden crops and potatoes are in good condition with a fair yield. The prospect for fruit is good. The rains have kept pastures fresh and feed abundant. Rye, oats and barley are in good condition, but all are used for forage.

HAMPDEN COUNTY.

Blandford (E. W. Boise). — Potato bugs are doing some damage. Indian corn is small and the stand is poor; three-fourths of the crop will go into the silo. Hay will probably be a full average crop when secured, much of that cut has been wet before being put in. Oats, barley and millet are our principal forage crops and are in fair condition. Potatoes are in good condition. Apples will be a full average crop; a few pears and no peaches. Pastures are in good condition. Rye is a full average crop; oats and barley are principally cut for forage and are fair, although they show some rust.

Granville (Joseph Welch). — There are no insects except a few potato bugs. The corn crop is in very poor condition. So far as hay has been secured it will compare very favorably with former years as to quantity and quality. Corn is our principal forage crop both for the silo and to help out the pastures and more was planted this year than usual. The potato crop is the finest in some years past. Apples are looking finely and the prospects are for a large crop. Pasturage is in very good condition. Rye, oats and barley are mostly grown for fodder and are looking well.

Southwick (L. A. Fowler). — Cut worms and potato bugs are doing some damage. Corn is backward owing to cold weather. Since the rains the condition of the hay crop is improved. Hungarian grass, millet and sweet corn are our principal forage crops; condition good; many have not sowed these crops so an increase is probable. Potatoes promise well and those already harvested have yielded well; prices slightly lower than usual. Apples good; other fruits scarce. Pastures are in good condition. Rye, oats and barley promise well.

Westfield (C. F. Fowler). — Elm leaf beetles are very plentiful. Corn is about an average crop; only a small portion of it will go into the silo. Hay is about an average crop, but has been badly damaged by wet weather. Oats and corn are our principal forage crops and about the usual quantities have been put in. Market-garden crops have done well; potatoes look extra fine, but have commenced to rot. Baldwin and Nonesuch apples look well;

Greenings scarce; pears half a crop; peaches but few; plums dropping badly; quinces a fine crop but rotting. Pastures are in good condition. Rye, oats and barley are average crops.

West Springfield (J. N. Bagg). — Elm leaf beetles and potato bugs are doing some damage, the latter less than usual. Indian corn is luxuriant; perhaps one-eighth of the crop will be siloed. Hay was a large crop in quantity but poor in quality. Corn is our principal forage crop and the usual quantity was put in. Market-garden crops, including potatoes, are in extra good condition. The prospect is good for all kinds of fruit. Pasturage is in good condition. Rye, oats and barley are fair crops. We have had poor hay weather thus far, and much hay is spoiling.

Longmeadow (W. F. Emerson). — Elm leaf beetles and potato bugs are doing some damage. Some fields of corn are very good, many very poor. The hay crop is of good quality but not large and only a small part of it is as yet secured. Market-garden crops are looking well; no potatoes dug as yet. Apples and pears promise fair crops. Pasturage is uncommonly good for the time of year. No barley raised and few oats; rye straw is a light crop.

Wilbraham (E. C. Clark). — Cut worms and peach and apple borers are doing some damage. Indian corn is a poor crop; about one-third of it will go into the silo. Hay is three-fourths of an average crop, but is mostly of No. 1 quality. Millet, oats and barley are our principal forage crops; condition good and one-fourth more raised than usual. Potatoes promise a good crop though few have been dug. Apples good; peaches a fourth above the average; grapes plenty; other fruits scarce. Old pastures are short and thin, others very good. Rye 90 per cent; oats and barley 110 per cent.

Palmer (O. P. Allen). — Insects are not much in evidence. Corn is very backward; about the usual amount will be used for ensilage. Hay is not quite up to the average and much has been damaged by foul weather. Corn and rye are our principal forage crops, with some oats and barley. Market-garden crops are quite good for a late season; potatoes have done well in yield and price. The prospect for fruit is not as good as usual; apples are dropping badly. Pastures are in quite good condition. Rye, oats and barley promise well.

Wales (G. A. Rogers). — Indian corn is slim, owing to cool, wet weather; one-fourth of the crop will go into the silo. Hay is fully an average crop and of good quality. There is a very little Hungarian grass sown as a forage crop. Market-garden crops fair; potatoes look finely, those dug yield well and bring fair prices. Apples will be a very light crop for the bearing year;

pears, peaches, plums and quinces very light. Pastures have done unusually well owing to the wet season. Very little rye sown; oats look finely and probably from one-third to one-half the crop will be cut green for hay.

WORCESTER COUNTY.

Brookfield (F. E. Prouty). — Indian corn is about a week or ten days late; about one-third of the crop goes into the silo. Hay is a good crop in both quantity and quality. Corn, barley and millet are our principal forage crops. Market-garden crops are yielding well and potatoes look well. Apples look well; pears a fair crop; peaches small and not much raised; only a few plums and quinces raised but they look well; cranberries killed by high water. Rye, oats and barley are rather more raised for grain and forage than formerly.

North Brookfield (J. H. Lane). — Potato bugs and squash bugs are doing some damage. Corn is coming forward very slowly and crows did much damage early in the season; 20 per cent of the crop will be used for ensilage. The hay crop is above the average in both quantity and quality. Corn, Hungarian grass and a few peas are our principal forage crops. Potatoes did finely up to within a few days. Apples 33 per cent, pears 10 per cent and grapes 90 per cent of full crops. Pasturage is in good condition. Oats are in good condition.

Spencer (H. H. Kingsbury). — Potato bugs are doing some damage. Indian corn is two weeks late; about one-third of the crop will be put into the silo. The quantity of hay is short of the average, but the quality thus far is excellent. Millet, oats and corn are our principal forage crops. Potatoes are looking thrifty and promise a good crop. Apples will be plentiful, except Baldwins, but not as many as two years ago; grapes a full average crop; other fruits scarce. Pasturage was getting short, but the late rains have improved it. The season has been very favorable for oats and barley.

Rutland (L. S. Dudley). — Potato bugs and wire worms are doing some damage. Corn looks small and most of the crop will go into the silo. Hay will be about a two-thirds crop as regards quantity and of good quality. Corn and Japanese millet are our principal forage crops. Market-garden crops are backward and potatoes look well. The prospect is good for most kinds of fruit. Pasturage has been a little short. Rye, oats and barley promise to be about average crops.

Hubbardston (C. C. Colby). — Our common insects are not as plenty as usual this year. Indian corn is very backward and the present outlook is for a small yield; 80 per cent. of the crop will be put into the silo. The hay crop is of good quality and will be an average in quantity. A large amount of Japanese millet has been put in for forage, also peas and oats, golden millet, Hungarian grass, etc. Potatoes and other vegetables have made excellent growth and give promise of large crops. Apples, pears and grapes promise very well. The rains have kept pasturage in good condition.

Royalston (C. A. Stimson). — Potato bugs are doing some damage. Indian corn will be almost a total failure. The hay crop will be about as usual as to quantity but of poor quality. Barley, oats and millet are our principal forage crops and are in good condition; more raised than usual because of the failure of the corn crop. Potatoes are a fair crop; very few yet harvested and prices high. Apples good; no pears; few plums; grapes good. Pastures are in good condition. Rye, oats and barley promise average crops.

Winchendon (Arthur Stockwell). — Potato bugs and tent caterpillars are doing some damage. Indian corn is very backward and will not be half a crop. The hay crop is not quite as good as last year. Hungarian grass has been sown by some of our farmers as a forage crop. Market-garden crops are looking finely. There will not be as large a fruit crop as in former years. Pasturage is in fine condition at present. Rye, oats and barley are about up to the standard.

Westminster (A. J. Foskett). — Potato bugs are doing some damage. Indian corn is looking well but is backward. The hay crop is very good having increased wonderfully in the past month. Forage crops are not much raised. Early potatoes are yielding finely and selling well; all market-garden crops are doing well. There will be a fair crop of apples and peaches, but not many pears. Pasturage was never better. Rye, oats and barley promise fair crops.

Fitchburg (Jabez Fisher). — The hay crop is nearly up to the average in quantity and is of good quality. Apples will be a fair crop of good quality; pears a small crop, also plums; peaches extra good; grapes fair. The first of the month was cold and dry; now it is cold and wet and most vegetation is late.

Bolton (H. F. Haynes). — Potato bugs are doing a little damage. Corn is a failure on all low lands. The hay crop is 100 as to quantity and quality. Millet is much grown here as a forage

crop. Market-garden crops are good and command good prices. Pasturage is in good condition. Rye, oats and barley are all cut for hay.

Holden (Geo. S. Graham). — Potato bugs and cut worms are plentiful, but not unusually troublesome. Corn is very small and backward and it hardly looks now as if any of it would ripen. Hay is nearly an average as to quantity but much of it is unsecured. Corn, oats and Japanese millet are raised in about the usual quantities as forage crops. Potatoes look fairly well, but seem to be turning yellow or blighting in some cases. Fruit of all kinds seems to be doing well, though many Baldwin apple trees are not bearing at all. Pastures are short but the late rains may improve them. Rye was a good crop; oats and barley not as heavy as in many years.

Southborough (E. F. Collins). — Indian corn is small but is of good stand and color. The hay crop was 90 per cent in yield and of good quality and the second crop is well started. Large fields of sweet corn have been planted for fodder. Market-garden crops are in good condition, but a little late; potatoes promise a good yield. Apples about a one-third crop; peaches a good crop of good quality. Pastures are in average condition.

Millbury (Herbert McCracken). — Potato bugs are doing some damage. Indian corn is backward; the greater part of the crop will go into the silo. Hay is fully up to the average in quantity and of extra quality. Corn, barley and millet are the principal forage crops grown; condition good and about the same amount as usual raised. Market-garden crops are in fair condition; potatoes have not been harvested to any extent. The fruit crop promises to be good but apples are dropping badly. Pasturage is in good condition. There will be heavy crops of rye, oats and barley.

Oxford (D. M. Howe). — Potato bugs are doing some damage. Corn is backward, three-fourths of the crop will go into the silo. The hay crop is heavy on good farms and about as usual on poor land. Hungarian grass and millet are the principal forage crops grown and the acreage is about the same as usual. Apples good; pears and peaches few; grapes good. Rye, oats and barley are average crops. Haying is well under way, but large quantities were caught out and were down for some time.

Mendon (J. J. Nutter). — Potato bugs and squash bugs are doing some damage. Corn is backward; only a small proportion of the crop goes into the silo. The quality of the hay crop is good if cured well, but it is not average in quantity. Corn is the principal forage crop and is in very good condition for that purpose.

Condition of market-garden crops very good; yield of potatoes very good and prices as high as usual. The apple crop will not be abundant; peaches, pears and grapes light crops. Pastures are in very good condition. Oats are looking very well; rye and barley not much raised.

MIDDLESEX COUNTY.

Hopkinton (W. V. Thompson). — Potato bugs are doing some damage. Indian corn is late but is looking well. The hay crop was below the average in quantity but of good quality. Corn and Hungarian grass are our principal forage crops and are in good condition, with more raised than usual. Market-garden crops are in good condition, not many potatoes harvested; early cabbages good. Apples light; no pears; peaches good; not many plums; few quinces; grapes an immense crop. Pasturage is in good condition. Rye, oats and barley are good crops and are mostly used for forage.

Sudbury (E. W. Goodnow). — Potato bugs and striped cucumber beetles are doing some damage. Corn is looking well but is backward; about half the crop goes into the silo. There will be an average crop of hay of good quality. An unusually large crop of fodder corn is being raised to supplement the hay crop. Market-garden crops of all kinds are looking and yielding well, with prices normal. The prospect for apples is not very encouraging; other fruits look fairly well. Pasturage is looking unusually well.

Stow (Geo. W. Bradley). — Potato bugs and squash bugs are doing some damage. Indian corn is two or three weeks late; about half the crop will go into the silo. Quantity of the hay crop about two-thirds that of last year and quality good. Hungarian grass, oats, barley and Japanese millet are the principal forage crops; looking well and more sown than usual. Potatoes are looking well but not many have been marketed as yet. Not so many apples will be gathered as usual; other fruits rather scarce. Rye, oats and barley are largely raised for forage and but little for grain.

Townsend (G. A. Wilder). — Indian corn is in fair condition and three-fourths of the crop is destined for the silo. The quantity of the hay crop is less than usual and the quality not as good as usual. Market-garden crops are above the average in condition, and potatoes are about normal. Early apples are half a crop and there will be very few late ones; other fruits light; early frosts the cause. Pastures are in good condition. Rye, oats and barley are about average crops.

Pepperell (P. J. Kemp). — Potato bugs are doing some damage. Indian corn is very backward; only five silos in town so the proportion of the crop that will be put in is small. Hay is about a two-thirds crop of good quality. Sweet corn, field corn, barley and millet are the principal forage crops and rather more than usual are being raised. Potatoes are looking the best for years but very few have been harvested as yet. There will not be a full crop of apples; no pears; peaches a failure; other fruits fairly good. Pastures are in good condition. Rye, oats and barley are about average crops; not much raised for grain.

Chelmsford (P. P. Perham). — Canker worms and potato bugs are doing some damage. Indian corn is late and needs warm weather; half the crop will be put into the silo. The hay crop is one-fourth below the average, but of good quality. A large amount of forage crops consisting of oats, Hungarian grass and millet have been put in. Potatoes promise a large crop. Apples, grapes and cranberries will be below the average; peaches and plums above the average. Pasturage never looked better.

Carlisle (E. J. Carr). — Potato bugs are doing some damage. Corn made a good stand but is very small; none will go into the silo. The hay crop is a little below the average in quantity, but is of good quality. Fodder corn and barley are our principal forage crops; condition good and no more than usual raised. Market-garden crops are better than usual; potatoes are making a fine yield and bringing good prices. Apples, peaches, plums, grapes and cranberries will be more than average crops. Pastures are in the best of condition. Rye, oats and barley are good as forage crops.

Lexington (F. L. Piper). — Tent caterpillars, canker worms and a few brown tail moths are doing damage. The corn crop is very backward; about two-thirds will go into the silo. Hay is a very small crop and of poor quality on account of bad weather. Fodder corn is the principal forage crop and is backward with about the usual acreage. Market-garden crops are looking well and potatoes are better than usual. Early apples are plenty, late ones not as good; other fruits not plenty. Pastures were in rather poor condition, but the rains have improved them lately. Rye, oats and barley are average crops.

Woburn (W. H. Bartlett). — Brown tail moths and potato bugs have been doing damage. Haying is well along with about half a crop of generally good quality. Hungarian grass, sweet corn and oats are the principal forage crops. Market-garden crops are very fair in condition and yield; prices have been good, perhaps better than usual. Apples half a crop, early apples very

wormy from the codling moth; plums rotting on the trees; pears will be a light crop, almost a failure; few peaches; grapes a fair crop; currants made a light yield; very few quinces. Rye, oats and barley are about average crops in yield and quality.

Wakefield (Chas. Talbot). — Potato bugs and striped squash bugs are doing some damage. Owing to cool weather corn is not doing well; two-thirds of the crop will go into the silo. Hay is not more than two-thirds of a crop. Corn, rye, barley, oats and Hungarian grass are our principal forage crops, and all are doing well except corn. Market-garden crops are looking finely and doing well; prices fully up to the standard. An abundant crop of apples is promised; no pears; peaches fair; plums light; quinces average; grapes plenty; cranberries fair. Pasturage is in about average condition. Rye, oats and barley will be fully equal to former years.

Stoneham (J. E. Wiley). — Indian corn is but very little raised. Hay is a fair crop. Fodder corn is the principal forage crop grown and is in good condition with no more grown than usual. Market-garden crops are looking finely; potatoes extra good but very few dug as yet. Apples good; pears fair; grapes good. The late rains have made pastures look well.

Weston (H. L. Brown). — Potato bugs have been quite troublesome. Indian corn is in poor condition; a large portion of the crop hereabouts is planted especially for the silo. The quantity of the hay crop is below the average and the quality good. Corn, millet and barley are the principal forage crops grown and about the usual amount has been put in. Market-garden crops are looking well; yield of peas small, prices high; potatoes are looking well, but none have been harvested. Fruits generally promise good crops. Pasturage is very short. What rye is raised gave a good crop; barley is mostly grown as a late crop.

ESSEX COUNTY.

Methuen (A. L. Harris). — Indian corn was doing well until the rains came; silos are not much used. Hay is of good quality, but not so much as last year will be secured. Cow peas, fodder corn, oats and buckwheat are our principal forage crops, and the farmers are raising more of them each year. Market-garden crops are good; potatoes are giving an average yield with good prices. Apples are poor; pears good; grapes good. Pasturage is good owing to the rains. Haying is about half finished and there are a good many tons out and beginning to rot on the ground.

Haverhill (Eben Webster). — Corn is in good condition and

about two-thirds of the crop will go into the silo. The hay crop is about average as to quality and quantity. Hungarian grass, oats, barley and corn are our principal forage crops and are in very fair condition. Potatoes are plenty and good at from 90 cents to $1 per bushel. Peaches and grapes promise full crops; apples, pears and plums one-third of full crops. Pasturage is in very good condition. Rye, oats and barley are a little better than usual for forage; none grown for grain.

Groveland (Abel Stickney). — Potato bugs are doing some damage. Indian corn is very small for the time of year; about one-fourth the crop is for the silo. The hay crop is large, but the weather has been bad to secure it in good condition. Rye, oats, barley, millet and corn are our principal forage crops. Potatoes are a good crop with prices above the average. Apples good; pears poor; peaches good; plums fair; grapes good. Pastures are in good condition.

Rowley (D. H. O'Brien). — Potato bugs and black flies on cattle are causing some trouble. Indian corn is looking well and none will go into the silo. The quantity of the hay crop is much smaller than usual with about average quality. Sweet corn for the silo, and millet and Hungarian grass for green feed are our principal forage crops; condition good and about the usual acreage. All garden crops are good, but prices are lower than usual. The prospect is good for all fruits but apples and pears; apples will be about a two-thirds and pears a three-fourths crop. The recent rains have improved the pastures so that they are very good. The celery crop is much larger than usual and is looking well. A large proportion of the onion crop was destroyed by maggots.

Topsfield (B. P. Pike). — Indian corn is very backward; one-fourth of the crop will go into the silo. Hay is about a two-thirds crop of fair quality. Corn, oats and millet are our principal forage crops; acreage about the same as usual and condition poor. Potatoes look well; yield of other market-garden crops short. Apples good; pears fair; other fruits good. Pastures are in fair condition. Not as much Japanese millet is being raised as last year.

Danvers (C. H. Preston). — Corn is in good condition and almost all the crop will go into the silo. The hay crop will be light and has been injured in the making. Millet, Hungarian grass, oats and peas, corn and barley are our principal forage crops; condition good and more raised than usual. Market-garden crops are in good condition and potatoes promise a fair crop. Early apples are a small crop, late apples promise a good crop; pears a

small crop; peaches, plums and grapes good. Pasturage is in good condition. Rye, oats and barley are fair crops.

NORFOLK COUNTY.

Randolph (R. A. Thayer). — Squash bugs are doing some damage. Indian corn is very promising; 90 per cent of the crop is raised for the silo. Hay is 90 per cent of a full crop and is of good quality. Fodder corn, barley, millet and Hungarian grass are largely raised; condition good with the usual amount planted. Condition of market-garden crops good; potatoes above the average as to yield and price. Apples good; very few pears; grapes very promising. Pastures are in fine condition. Rye, oats and barley are good average crops, mostly used for forage.

Canton (E. V. Kinsley). — Corn is backward; nearly all the crop is for the silo for green feed. Hay is a two-thirds crop and is somewhat damaged by wet weather. Corn, the millets, Hungarian grass, oats and peas and barley are our principal forage crops; more than usual raised and condition good. Garden crops look well, potatoes unusually so; prices good. Apples bid fair for a full crop; also grapes and cranberries; other fruits a short crop. Pasturage is rather short but is improving. Rye, oats and barley are short crops.

Norwood (F. A. Fales). — Potato bugs are doing some damage. Indian corn is in first-rate condition; three-fourths of the crop goes into the silo. Hay is 80 per cent of a full crop of rather poor quality. Oats, Hungarian grass and millet are our principal forage crops; condition good and rather more than usual grown. Condition of market-garden crops good; yield of potatoes good and prices high. The prospect for fruits of all kinds is not good; too early to report on cranberries. Pasturage is in good condition. Rye, oats and barley are fair crops.

Westwood (J. E. Weatherbee). — Corn is looking well, but is late; only a small per cent will be put into the silo. Hay is a fair crop of good quality, but the weather has been unfavorable for securing it. Fodder corn and Hungarian grass are our principal forage crops; both are looking well and more are raised than usual. Market-garden crops are doing well, with good yields and fair prices; potatoes have not been dug as yet. Plums are a short crop; other fruits good. Pastures are light owing to dry weather early in the season. There was a fair crop of oats, which was cut for hay.

Franklin (C. M. Allen). — Potato bugs are less prevalent than usual. Corn is backward; perhaps one-tenth of the crop will go

into the silo. There is an average crop of hay, but the quality is not quite as good as last year. Millet and barley are our principal forage crops; millet looks well, barley not all sowed yet. Early potatoes are an excellent crop with good prices. Apples promise a large yield; pears small; peaches and plums good; quinces good; grapes heavy; cranberries light. Pasturage is in more than average condition. Rye, oats and barley are very good crops. More hay than usual has been injured by wet weather in curing.

Medway (Monroe Morse). — Potato bugs have been quite prevalent. Corn is backward and is not a good stand; probably not over one-fourth the crop will be put into the silo. Hay on land in good condition is an average crop, but is light on old fields. Apples, peaches and plums good; pears light; grapes fair. Pastures have been quite good, but are now getting short. Rye, oats and barley are average crops.

BRISTOL COUNTY.

Easton (H. M. Thompson). — Potato bugs, striped squash bugs and cut worms are doing damage. Indian corn is coming forward splendidly; practically none will be put into the silo. The hay crop was light and not average in quality owing to drought and miserable weather at haying time. Oats and Hungarian grass are our principal forage crops and they are looking very well. All market-garden crops are a little backward; potatoes have grown slowly and will not yield quite as heavily as an average crop; prices so far well sustained. Good crop of apples expected, although not a bumper one; pears very light; peaches plentiful; plums and quinces fair; cranberries well set. Pasturage is in very fair condition. Rye, oats and barley are good crops.

Mansfield (Wm. C. Winter). — Potato bugs are doing some damage. Corn is looking well but is very late; little, if any, will go into the silo. Quality of the hay crop fair, quantity about two-thirds of an average. Sweet corn and Hungarian grass are our principal forage crops. Garden crops generally started poorly, but have yielded fairly well; potatoes very good, prices above average. Apples, except Baldwins, generally a fairly good crop; pears fair; peaches and Japan plums good; quinces fair; grapes fair but late. Pasturage is generally good.

Attleborough (Isaac Alger). — Potato bugs are doing some damage. Corn is in good condition; no silos hereabouts. Hay is a full average crop. Corn and the millets are our principal forage crops; farmers are growing more of the millets from year to year. Market-garden crops have been good with prices better than

usual; potatoes never looked better. Apples good; pears light; grapes fine; cranberries not as well set as last year. Pastures are in good condition. Rye, oats and barley are full average crops.

Raynham (N. W. Shaw). — Potato bugs are fewer than usual. Indian corn is in very good condition; none raised for the silo. Hay is about half a crop with quality not as good as usual. German millet and corn are our principal forage crops and more are being raised than usual. Market-garden crops are about average in yield and price. Apples good; pears few; peaches good; plums few; grapes good; cranberries in fair condition. Pasturage is in good condition.

Swansea (F. G. Arnold). — Elm leaf beetles are doing some damage. Indian corn is in very good condition; there are only a few silos in town. Hay is nearly a full crop and the quality is good. Corn is our principal forage crop, is in good condition and much more is raised than usual. Market-garden crops are in good condition; cabbages very plenty and prices low; potatoes are a heavy crop with fair prices. Apples, pears and peaches promise a good yield. Late rains have put pastures in good condition.

Acushnet (M. S. Douglas). — White grubs are working badly. Corn is in good condition and growing fast; a very small proportion of the crop will go into the silo. Hay is about a two-thirds crop of good quality. Millet and fodder corn are our principal forage crops; condition fairly good and about the usual amount raised. All market-garden crops have done exceedingly well; potatoes will be a big crop and prices have fallen. There will be plenty of apples and grapes; pears, peaches, plums and quinces scarce. Pastures are in good condition. Rye, oats and barley are very good crops.

PLYMOUTH COUNTY.

West Bridgewater (C. P. Howard). — Owing to the cold nights corn is late; more than half the crop will go into the silo. The hay crop is up to the average in quantity and of good quality. Hungarian grass, barley and corn are our principal forage crops. A large crop of potatoes is promised with prices low. There will be a large crop of apples in all sections. Pastures are in good condition. Oats and barley are cut green for forage.

Hanson (F. S. Thomas). — Indian corn is in good condition and none of it will go into the silo. The hay crop is good but there has been but a poor chance to make it. Corn, oats and rye are our principal forage crops; condition good and no more than usual raised. Market-garden crops are in good condition. There

will be some fruit of all kinds, but not a large crop. Pasturage is in good condition. Rye, oats and barley are good crops.

Halifax (G. W. Hayward). — Corn is very backward, but is growing fast and is of good color. Hay was of good quality and nearly an average crop as to quantity. Corn and Hungarian grass are our principal forage crops and have improved in condition since the rains. All market-garden crops are looking well with prices about average. Apples, peaches, grapes and cranberries will be very good indeed. The recent rains have improved pastures, which were very poor. Rye is the only crop grown for grain and is a good crop.

Kingston (Geo. L. Churchill). — Potato bugs are doing some damage. Indian corn is fairly good; about two thirds of the crop will go into the silo. Hay is about a two-thirds crop of good quality. Corn is our principal forage crop, and is in good condition with about the usual amount grown. Garden crops are very good; potatoes good with prices about as usual. Apples promise well; pears not as well; not many plums or peaches. Pastures show abundant feed for the time of year. Rye, oats and barley are in very good condition.

Carver (J. A. Vaughan). — Potato bugs and plum curculios are doing some damage. Indian corn is in good condition; no silos. Hay is an average crop in quantity and quality. Millet is our principal forage crop and is in average condition. Market-garden crops are in good condition and potatoes promise an excellent crop. There will be a small crop of all kinds of fruit. Pasturage is in excellent condition. There is only a small crop of cranberries promised; late varieties very small.

Rochester (Geo. H. Randall). — Potato bugs, cut worms and white grubs are doing some damage. Corn is strong and healthy; not over one-tenth of the crop goes into the silo. Hay is below average in quantity and of good quality. Indian corn, millet, oats and barley are our principal forage crops; condition good and acreage increased. Condition of market-garden crops good, more grown than formerly; prices satisfactory. Prospect good for all fruits, except pears and quinces. Pasturage is in fair condition. Rye, oats and barley are full average crops.

BARNSTABLE COUNTY.

Falmouth (D. R. Wicks). — Potato bugs and squash bugs are doing some damage. Corn is not quite as far advanced as it should be because of cool nights. Early cut hay yielded very little, but later cut gave half a crop. Market-garden crops are

good, fully up to former years; potatoes a large crop. Apples have dropped badly; few pears; peaches have dropped badly; plums half a crop; grapes good. Pasturage is as green as in June. Rye, oats and barley are fair crops but are little grown.

Dennis (Joshua Crowell). — Potato bugs have done some damage. Corn is a good crop; none goes into the silo. Hay is about a three-fourths crop; late cut damaged by wet weather. Fodder corn, Hungarian grass and oats are our principal forage crops; condition fair and about the usual amount grown. Potatoes yield well and prices are up to the average. Apples, grapes and cranberries are about average crops; few pears. Pasturage is in very good condition.

Chatham (E. Z. Ryder). — Squash bugs, cucumber beetles and potato bugs are doing some damage. Indian corn is looking finely; very little, if any, will be put into the silo. The hay crop was poor in quality and very light in quantity. Millet has been planted more this season than for several years and is doing well. Market-garden crops are above the average in yield and price; potatoes never did better. Apples, pears, peaches, plums, quinces and grapes promise average crops; cranberries look finely, with the prospect good for a large crop. Pastures are in very good condition. Oats are looking finely.

Wellfleet (E. S. Jacobs). — Squash bugs are doing some damage. Corn is backward, the cold nights retarding its growth. Hay is both a good and abundant crop. There is but little done with forage crops. Market-garden crops are good, but late, with prices above the average. Apples and pears scarce; peaches and plums plentiful; good prospect for cranberries. Pasturage is in fine condition.

Truro (D. E. Paine). — Cut worms and potato bugs are doing some damage. Indian corn is very little planted. Hay was about an average crop of fair quality. Market-garden crops are average in both yield and price. The prospect for apples is very poor; cranberries fair. Rye, oats and barley are average crops.

DUKES COUNTY.

West Tisbury (Geo. Hunt Luce). — Potato bugs are doing some damage. Indian corn is very backward; we have no silos. Quantity of hay much below the average, but quality good. To eke out the pastures rye, fodder corn and Hungarian grass are grown. Market-garden crops are below average in condition; potatoes above average with prices about as usual. Apples and grapes promise good crops. Oats are above the average in condition.

BULLETIN OF
MASSACHUSETTS BOARD OF AGRICULTURE.

BEEF PRODUCTION IN NEW ENGLAND.

By Prof. J. W. SANBORN, *formerly Director of the Missouri Agricultural Experiment Station, President of the Utah Agricultural College and Director of the Utah Agricultural Experiment Station.*

Are the present prices of beef and the promising outlook for beef production in New England due to permanent causes, or are they based upon transitory conditions? If new industrial agricultural conditions are at the root of the high prices of meat products they demand close attention and call for a new attitude on the part of our farmers towards the stock industry. The mighty expanse of free ranges laden with crops accumulated in an arid region, where they dry in perfection and remain palatable for a considerable period, afforded stock food at so nominal a cost as to have made nearly impossible competition by those living on high-priced lands and inadequate pastures. It practically obliterated beef production in New England.

It is probable that the corn shortage of 1901 of nearly one-half the usual production has aided the natural tendency to enhanced prices of beef, and that a return to normal crops will have a modifying influence on prices of meat products. The basic cause of the present satisfactory prices of meats is found in a constantly decreasing ratio of meat animals to population. From 1892, when the number of meat animals in the United States reached high-water mark, there has been a steady decrease in total number raised for the shambles.

	Cattle.	Sheep.	Swine.
1892, ...	37,651,239	44,938,365	52,398,019
1899, ...	27,994,225	39,114,453	38,651,631

The great live-stock markets have shown this year, despite the allurement of exceedingly high prices ($8.40 per 100 pounds live weight having been reached in Chicago), a marked decrease in receipts over last year and over preceding years for nearly a decade. Low prices, averaging for the country for cattle other than cows at the lowest point for a decade in 1895 but $14.06 per head, no doubt discouraged breeders and in part explains a decline of 9,667,014 cattle in the seven years from 1892 to 1899; but the constant rise from 1895 to 1899, from $14.06 to $22.79, failed to induce an increase in total numbers, or even to check the phenomenal decrease of stock. The present higher prices, nearly double those of 1895, make it evident that this further rise in prices has not given a sufficiently upward turn in the numbers of beef animals to meet growing demands for them.

I have not quoted from the last census as the basis of enumeration was changed and the proper basis of comparison destroyed. The statistician, however, regards it as probable that a loss of neat cattle of from 7 to 9 per cent occurred during the decade from 1890 to 1900. This decrease was accompanied by an increase of population of 21 per cent. The most significant feature of this probable decrease of neat cattle from 1890 to 1900 is in the location of the loss. It was found to be greatest in the great free-range section from whence has come the severest strain upon our beef producers. Is this loss due to the unprofitable character of the range beef production? No, but from the decreasing capacity of ranges. Settlers have withdrawn large areas and are constantly making inroads into the grazing section. Further trouble awaits ranchmen. Government is ordering fences down and rental rates are impending.

The chief cause of the decline of cattle is found in the character of the grass and atmospheric conditions. In this rainless area grass may accumulate and hold its quality and palatableness, as rains do not deteriorate it. Once the surplus is grazed off only the annual production can be had.

The insufficiency of moisture by the law of the survival of the fittest gives first place to the bunch grass, as a close mat of grass has a heavy vaporizing power. Once grazed off, vaporization from the soil direct occurs. Grazing cattle pull at the roots, and injure by trampling this bunched grass as they do not over close matted grazing areas. These and other causes account for the fact that on ground where cattle can be grazed the year round free of rental expense the numbers have been greatly reduced.

It is to be especially noted that during the brief period occupied in stocking the ranges their breeding stock and young things were

constantly being absorbed by the increased area annually occupied. When it became occupied in full all at once a great increase of range-fed cattle in eastern markets occurred. Prices went down, down, to rates impossible to duplicate by eastern feeders at a profit. This discouraged even range sales, and cattle, so far as conditions would admit, were held back, spreading low rates over years of time. At last the readjustment of cattle to range capacity is practically completed, except so far as settlers and agricultural methods modify the situation. This adjustment is upon the basis of greatly reduced numbers in the face of rapidly increasing population, and a constant absorption of range area into tillage farms. The range as a menace to beef production on farms has passed into history.

But may we not expect a competition from the agricultural west, the corn-growing west, — with its cheap grains for our markets, at rates unattractive to us? It appears that range competition repressed beef production in these States, as in them all there was a decline in cattle other than cows from 1890 to 1900. It is significant that this decline was coincident with exceedingly low prices of corn. Beef production in the corn States, at rates prevailing from 1892 to 1900, was not satisfactory, and any material increase in numbers of cattle cannot be expected under similar conditions. But there are those that will maintain that the great corn area of the United States, close to the supply of cheap protein foods, gluten, bran, middlings, linseed meal and cotton-seed meal, can override all competition and at best make it very discouraging to New England beef producers.

The present cost of shipping a 1,500-pound steer from Chicago to Boston is $4.20. The cost to ship the same from the average distance of his growth to Chicago will be as much more. Commissions and other costs will bring the total up to at least $10. This much for the tariff of distance in favor of the New England steer. Is it enough?

If we regard the producer of beef as a purchaser of all the feeds given it is not enough. It will require in round numbers 7½ tons of food to grow 1,500 pounds of steer. More than $10 more would be required to purchase this food here than in the west, the hay costing here double what it will there.

But we logically and correctly must view the feeder as the farmer marketing his own products on his farm through the steers in question.

In the west the hay fed may at market rates be sold or charged to the steer at a loss, while here at our rates at a profit. The transaction must be regarded as a whole.

Will the same amount of energy or expenditure here produce

1,500 pounds of steer that is required to purchase him there, and lay him down in our market?

The writer is pursuing a rotation of crops so far developed as to give fair warrant to the belief that 7½ tons of food, the amount estimated as required to produce 1,500 pounds of live steer, can be grown to advantage on 2½ acres of ground. Can the western producer grow this food on 2½ acres of ground more than $10 cheaper? In either case the feeders will have equal advantage in the manure produced for use on the farm and essentially the same cost of application.

The eastern farmer will have $4 per acre to expend for chemical fertilizers or plant food. Under wise management I do not hesitate to say that in a short series of years the New England producer would have the more productive farm, or, in other words, that he would be able to produce more beef per acre than the western feeder. Our soils have under intensive methods equal capacity of production and greater retentive powers.

The cost of tilling an acre of ground here may be slightly more than in the west, possibly a half dollar an acre more during a rotation period per year, and the protein foods essential for the rations in the early days of our steer are more costly. Possibly another extra $1 per acre will thus be absorbed. It is railroad policy to make long hauls cheap, and wholesale transactions to far-away buyers is on a lower scale of prices. Bran often sells by the car here within one or two dollars of local prices in the States from which it comes, while cotton-seed meal is but a little more in Boston than in Chicago. Gluten is shipped from Chicago to New England points for $3.90 per ton. At feeding points in the west it costs nearly as much. Aside from home-grown corn not over one ton of protein foods need be purchased. This seems like a partial second expenditure of the $10 advantage of location, amounting, for tillage and grain, to $3.75 for the 2½ acres, leaving a net of but $6.25, or $2.50 per acre, to bring, with the manure produced, our land in yield alongside western land. This would pay for 130 pounds of acid phosphate, 30 pounds of potash and 50 pounds nitrate of soda per acre annually. It is adequate to place our land on a parity with western land, and, in the end, before it in point of production.

Abundant experiment station investigations in the west show that the addition of manure to soils there producing no more than ours as ours are now treated gives but a meager gain in crops. Manuring does not increase crops as it does here, and in my experience is not as enduring. The intensive farming proposed, returning the excreta of well-fed steers and including an annual

application of 190 pounds of chemical manures, adds wealth to our soils, increases our crops and incomes. There are unpresented factors that disturb the calculation, such as cost of marketing our stock on the one side and the superior value of sale crops grown in any proper rotation here on the other. The balance will fall on the right side when all the other factors are considered.

I have handled cattle in a very rich section of the Mississippi valley and also in the ranch region, and am successfully building up a New England farm, and do not indulge in forced or merely speculative reasoning. It is possible to grow as much beef per acre in New England, at as good profit to him who produces the food he consumes, as is grown westward. We may feel assured that a higher range of prices is to prevail for reasons stated, namely: —

1. Their population is increasing rapidly, while beef production is stationary or losing ground.

2. That the vast free-range area has been absorbed, reached its limit of beef production, and far past it, and is on a heavy decline.

3. That the corn-growing and beef-fattening area of the West found beef production under past rates unremunerative and reduced its herds.

4. It may be added that world-wide economic forces — increase of gold per capita, decline in rates of new lands being taken up, increased ratio of urban people, general rise throughout the world of the purchasing power of the masses, and other causes tend to a rise of prices in all farm products.

Wherefore, then, existing conditions?

When the free ranges poured their first and fullest products upon us, and the free open prairie of the corn States yielded hay for the taking and our sons and money sought these opportunities and the new life and new industries of our expanding cities, eastern agriculture became discouraged, especially that part of it that felt the keenest edge of competition, — beef, mutton and wool production. The butter type of cow came in and the beef type went out. In great strides the west passed us in the art of breeding and feeding for beef. Outside of the market-gardening area in New England or in the area where beef making may find an appropriate sphere, agriculture has not kept pace with its opportunities.

The Essentials of Success.

Successful beef production in New England must rest upon —

1. A more intensive agriculture.

2. Better bred steers, — the good steer.

3. Better fed steers, — early maturity.
4. Better pastures.

Successful beef production in the twentieth century sense of that which constitutes success is possible only when accompanied with good to high farming. The ordinary 160-acre farm in this section cuts but a ton of hay per acre on some 30 acres, and requires 5 or more acres of pasture land, infested with weeds and bushes as they are, to carry a steer, and this by hard work on the part of the steer.

The food if of low quality, and, in total, home-grown supply will not carry more than a dozen animals. Slow growth and heavy cost of attendance per animal fed eliminate all hope of true profit. To care for 12 steers at $1.25 per day involves a cost per steer for care of 10½ cents per day, or $10.51 for 100 days, — a fatal cost. Triple the number and this cost becomes but one-third its former amount. To compete successfully with the west there must ever be in view the acre product of beef. To make it as great here as there imposes the necessity of a modern tillage rotation in which the rank growing annuals occupy a conspicuous place. These give variety and great acre production of food. Unless the soiling system, which I do not deem desirable, is adopted our pastures must be completely made over. It is not possible to make beef successfully on average New England pastures for reasons that will appear further on. They must be rotated with the fields, and made fertile and luxuriant, carrying well a steer to the acre, and good for 2 or more pounds gain daily for five months, or when not tillable cleared of bushes and weeds and treated with chemicals. For this purpose a mixture made up of 12 pounds each of nitrate of soda and dried blood, 10 pounds muriate of potash and 33 pounds each of acid and plain phosphate may be used, applying 500 pounds the first year and diminishing annually until 350 pounds are reached.

Good pastures and the richer and more varied foods of a tillage rotation of higher farming are prerequisites to the successful introduction of the good steer and his early maturity.

Without the good steer early matured profitable beef raising in the east is utterly hopeless. Indeed, all else right, failure is sure without a good steer and early maturity.

The Good Steer.

In experiments made by the writer with several breeds of beef types and with typical scrub steers it was shown that a pound of food made similar growths for the several breeds and scrubs. Since then these results have been confirmed. But breed does not

go in wholly at the mouth, for type is not made by food but by blood or inheritance. Type determines market prices, everything else being equal.

A good steer must have form, — deep and broad in the twist or thighs, thick through the crops or behind the fore shoulders, broad across the loins, well sprung ribs and straight round barrel. A Jersey or dairy type of steer, with flat ribs, sharp, thin shoulders, thin crooked thighs and narrow loins will not sell within one to three cents as much per pound as the beef type. The one carries a large ratio of high-priced meat, the other of low-priced meat. In the one case a 1,500-pound steer will bring, when rightly fed, $105 to $120 on present markets if perfected. The same weight in the dairy type would not bring more than $90. There is profit in the one and loss in the other. We must command the best or avoid the business. One-half the trouble with beef production east is in wasting good food on poor foundations. The quotations of this week's markets show a range of prices varying 33 per cent. on steers and oxen. All food at present prices put into the poorer steers is put there at a loss, yet this is the type prevalent in New England.

The west is putting its cheap food into the very best type of modern beef producing machines; we, high-priced food into the poorest.

Early Maturity.

Early maturity is the one factor of supreme importance in beef production, and our weakest one. Profit making from four and five year old steers has gone into oblivion with the post auger and hand reaper. It is only known where beef making is in great decrepitude or where food is practically free. The only beef that we can hope to make is baby beef. Thirty months should be old age for steers in the east and at twenty to twenty-four months they should be in their prime.

The philosophy of young beef is obvious. It requires about 16 pounds of food to maintain the existence of a 1,000-pound steer without growth. Unless more is given all is thrown away. If 17 pounds is fed, or one pound more than maintenance, growth occurs, and 6¼ per cent of the food given is productive. If 18 pounds, or 2 pounds excess food, is fed, then 12½ per cent of the total ration is productive force. The addition of the second pound of food adds 100 per cent to the efficiency of the first 17 pounds. If 30 pounds is given and eaten, as it may be, then 14 pounds excess food over the food of existence is taken, and 53⅓ per cent of the food given is directed to the processes of growth. No folly is

greater on the part of the feeder than scanting food or giving a maintenance ration, or just a little more. It wastes barn rations.

On our poor old pastures the hard task of grazing a living induces the steer to limit the struggle to little more than existence. Much goes to run the animal machine and little to growth, and an enormous waste results. Low feeding prolongs the period of growth from two to four years. Birth weight, considered the average weight of a 1,500-pound steer during growth, is about 720 pounds. Maintenance for such a steer is 11½ pounds daily. If four years are required to fit him for the shambles instead of two years, maintenance ration is lost for two years. This amounts to 4 tons 395 pounds. As this is the New England style of beef production, in this factor alone is found loss enough to ruin the business.

Type and Time.

The combination of a good type of steer with quick time of maturity has another important bearing. The good type can be sold at full market rates at less weight and therefore in less time than can the poor type. This is important, as the larger an animal grows the more it costs to make a pound of growth. Thus, in some experiments made by the writer at the New Hampshire and Missouri State colleges it was found that a pound of gain required a constantly increasing amount of food as calves increased in weight. Thus two calves, requiring when weighing 322 pounds 8.3 quarts skim-milk for a pound of gain, at 385 pounds weight required a pound of added meal to maintain the growth, a little later 2 pounds of grain, and at 512 pounds weight they were eating 5 pounds of hay in addition. At 638 pounds weight they had reached in addition to 20 quarts skim-milk and 3½ pounds grain, the consumption of 9½ pounds hay without added gain. Year olds weighing 750 pounds required 19 pounds hay for one of gain, two year olds of 1,000 pounds weight required 25 pounds hay for one of growth. Elaborate trials with swine have shown the same truth. The larger the animal the greater the machine to keep in motion and the more the tax of mere existence. Breed for perfection of beef form and feed for finished beef at the highest weight the market will accept at full prices.

Foods and Feeding.

This part of my subject invites a long chapter where a page or two is at command, and must be treated as have been previous sections of my subject, in mere generalizations.

The heavy percentage of the ration required for maintenance

makes it imperative that there shall be continuous growth from start to finish. All fat and lean periods must be resolutely eliminated. The fattening period properly begins when the calf is born, if not before. This demands barn feeding until full pasture feed and during early fall months. The year the steer is finished for market grain should be fed at pasture and must be fed each year until ideal pastures are secured if baby beef is to be made. I have seen in Missouri corn constantly before steers in pastures where the Kentucky blue grass was "up to the eyes," — as high as 500 pounds growth being made in the grazing season. Such feeding ultimates in good pastures. The advice to grain feed steers at pasture will appear radical; but the solid beef, well marbled, that now brings 8½ cents a pound in Chicago, 1,000 miles west, while ours sells for one to three cents less in the final market here, is a type of beef to be had only by such feeding, and will pay us to produce.

I am not friendly to heavy grain feeding but to continuous grain feeding from birth to slaughter. A fattening period, a stuffing period with fattening foods, means fat put on in layers, and a soft, oleaginous handling steer. The calf starts on skim-milk and protein foods, like linseed, oatmeal, middlings and gluten meals. The rise in grain from the first half pound is gradual until at a few months old 3 to 4 pounds are given. The rise may follow gain of steer and may after 400 or 500 pounds are reached fall below one per cent of live weight, dropping, as weight goes up, to two-thirds of one per cent if the other attains 1,300 to 1,500 pounds. It is better to have types that will sell decidedly under this extreme. It is customary to advise heavy grain feeding, but experiment station work and my own observation show that high grain rations are not economical, nor are they necessary if grain is continuously fed from the start and growth is constant.

The protein foods increase the ratio of lean meat but if fed alone will not give the desirable color of carcass that corn meal will. At the start the foods may be wholly the protein meals named, the kinds being determined by the markets, gradually being supplemented by corn meal. At the close of feeding corn meal may make to advantage half to two-thirds of the ration. The coarse foods should be varied, giving edge to the appetite, and should include, especially for calves, clover, and at all ages ensilage.

Both for grain and coarse foods two rations or rather meals only, which may be made up of more than one ration, should be given. Trials seem to show that feeding at noon is without advantage. It is a matter of indifference whether the grain is given before or after watering.

The feeds of all kinds must be palatable or fed with great skill. Palatableness is not necessarily nutritive in effect, but induces free consumption, the taking in of a goodly proportion of excess food. Foods vary in palatableness, and some unpalatable ones must at times be given. These may be fed at the time of day when appetite is best, and for the coarse foods in small amount, kept replenished and in fresh form so long as they are accepted. In a large ration its most palatable portions will be selected, and the balance breathed on and drooled over and finally rejected.

Nothing has been said about the balanced ration and an immense amount of scientific and practical data passed over. The balanced ration ramifies into other questions and requires too much elaboration for presentation here. Indeed, if feeding follows the lines laid down the balanced ration may be safely ignored.

The Cost of Beef.

An approximate estimate of the cost of growing 1,250 pounds of steer can be made from existing data. Careful calculations show that the manure of the purchased grains, if protein or rich in nitrogen, will pay rent of building and attendance or care of cattle, and more than do this if the attendant's time is fully occupied. The grains for a series of years will probably be secured for 1 cent a pound. The coarse foods may be rated at $10 per ton. Passing the details by months and roughly approximating the averages I estimate the 600 pounds steer — the average growing weight of the one under consideration — to consume in the 700 days allotted for his growth, covering two winters, with 4 pounds per day the first winter after October birth, 3 pounds to pasture during the first summer, 6 pounds per day the second winter and summer, 3,350 pounds of grain, or 0.78 per cent of live weight daily. He will consume of hay, or coarse food in the equivalent of hay, 2 per cent of live weight daily, or 5,300 pounds, costing $26.50. Pasturing first year $4 and $6 the second year. No skim-milk is included, as grain and hay are included from the start in amounts fully covering the cost of skim-milk. The total cost is $70 or 5.6 cents per pound live weight.

The type of steer in question is likely to remain worth more than this by several dollars. At 6½ cents live weight his value would be $81.25.

I am aware that questions for debate are involved, and that in a sense little direct profit is shown. The business of farming in New England is that of crop growth, stock feeding being a method of acquiring the manure to feed the crops. If these crops

can be sold on the farm to stock at a profit for their production, it is all that we can expect and is fairly satisfactory. Whether these crops should be disposed of to sheep, horses, cows or direct to the markets, rather than to steers for beef, or whether we should replace the fertility essential to maintain crop sales, involves other questions. I am confident that the good breeder and feeder will secure his plant food for crop growth cheaper by beef production than in the form of purchased fertilizers. I hold that at current rates for the best beef, or even for a slightly reduced rate, up to 1,200 pounds weight properly bred and fed, beef making will afford a fair market for our crops, and the good steer a debatable competitor of other live stock.

I have based my conclusions in the main on a voluminous amount of scientific and practical data that I find it impracticable to quote in a brief paper of this kind.

MASSACHUSETTS

CROP REPORT

FOR THE

MONTH OF AUGUST, 1902.

ISSUED BY

J. W. STOCKWELL,

SECRETARY STATE BOARD OF AGRICULTURE.

BOSTON:
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1902.

Crop Report for the Month of August, 1902.

Office of State Board of Agriculture,
Boston, Mass., Sept. 2, 1902.

Bulletin No. 4, Crop Report for the month of August, is herewith presented. Particular attention is called to the article on "Some inexpensive ways of making farm poultry more profitable," by John H. Robinson, editor of "Farm Poultry," which should be of particular interest and value to all farmers who make poultry keeping a principal part of their farm operations.

Progress of the Season.

The August returns of the United States Department of Agriculture (Crop Reporter for August, 1902) show the condition of corn to have been 86.5 on August 1, as compared with 87.5 a month earlier, 54 on August 1 of last year, 87.5 in 1900, and a ten-year average of 84.

The statistician estimates the winter wheat crop at about 380,000,000 bushels, or an average of 13.8 bushels per acre. If this estimate, which is subject to revision, is somewhat higher than was indicated by previous reports of condition, it is due to the fact that the crop is turning out somewhat better than was expected. The average condition of spring wheat on August 1 was 89.7, as compared with 92.4 the previous month, 80.3 in 1901, 56.4 the year previous, and a ten-year average of 80.

The average condition of oats was 89.4, against 92.1 a month earlier, 73.6 last year, 85 in 1900, and a ten-year average of 82.2. All the principal oat States still have a condition comparing favorably with their ten-year average.

The average condition of barley declined 3.5 points during July, but on August 1 it was still 3.3 points higher than at the corresponding date in 1901, 18.6 points higher than on Aug. 1, 1900, and 6.8 points above the mean of the ten-year averages.

The average condition of spring rye improved 1.2 points during July. On August 1 it was 6.9 points higher than last year, 14.5 points higher than on Aug. 1, 1900, and 5.3 points above the mean of average for the past ten years. Only one of the principal States, however, shows an improvement in condition during the month.

Preliminary returns indicate a decrease of about 6,000 acres, or .8 per cent, in the acreage of buckwheat, as compared with last year. The average condition of buckwheat is .3 points higher than at the corresponding date last year, 3.5 higher than on Aug. 1, 1900, and 1.4 points above the mean of the August averages for the past ten years.

The average condition of potatoes improved 1.9 points during July, and on August 1 was 32.5 points higher than at the corresponding date last year, 6.6 points higher than in 1900, and 11.1 points above the mean of the August averages of the past ten years.

Of the 11 principal sweet-potato-producing States, only 2 report an improvement in condition during July. The others show declines ranging from 1 to 18 points.

Preliminary returns indicate an increase of 1.1 per cent in the hay acreage. Of the 11 States mowing 1,000,000 acres or upward last year, 6 report increased and 5 decreased acreage. The condition of timothy hay improved 5.1 points during July, and is 4.8 points above the mean of the August averages of the past eight years.

Reports as to the production of clover are, on the whole, unfavorable. In point of quality the crop is below that of last year, and also below the ten-year average.

The excellent condition of pastures was well maintained during July, an improvement of 3.8 points being made during the month.

The changes in the condition of tobacco during the month were unfavorable in every important tobacco-producing State except Pennsylvania.

Notwithstanding there being a decline in the condition of apples, as compared with a month earlier, in many States, reports from nearly every important State indicate that more than an average crop will be secured.

In every important sugar-cane-producing State except

Texas the condition August 1 was considerably below that of last year.

Except in New York, the condition of hops was higher than at the corresponding date in 1901.

The condition of rice was below that of last year, and also below the mean of the August averages of the past eight years, in every important State except Texas.

The average condition of cotton July 25 was 81.9, as compared with 84.7 on June 25, 77.2 on July 25, 1901, 76 on Aug. 1, 1900, 84 on Aug. 1, 1899, and a ten-year average of 82.8.

In Massachusetts the average condition of corn was 80; the average condition of oats, 98; the average condition of spring rye, 98; the acreage of buckwheat compared with last year 90, and the average condition 85; the average condition of tobacco, 86; the average condition of potatoes, 102; the acreage of hay compared with last year, 99; the average condition of timothy, 93; the production of clover, 93; the quality of clover, 89; the average condition of pastures, 102; the average condition of apples, 84; and the average condition of hops, 100.

Temperature and Rainfall for the Whole Country.

[From the United States Climate and Crop Bulletins.]

Week ending July 28. — The week averaged cool in all districts east of the Rocky Mountains, with the exception of the Red River of the North valley and the northern portion of the Lake region, where it was slightly warmer than usual. On the Pacific coast and over the middle and northern Plateau districts the week was warmer than usual. Very heavy rains fell over the greater part of Texas and in Florida and southern Georgia, and more than the usual amount over portions of the Missouri and upper Mississippi valleys, Lake region and Middle Atlantic States. The central Gulf States, Tennessee, the Ohio valley, the southern portion of the Middle Atlantic States, the Carolinas, the upper Missouri and Red River of the North valleys and the northern Rocky Mountain and north Pacific coast States received less than the usual rainfall.

Week ending August 4. — The week was slightly cooler

than usual in the west Gulf States, in extreme southern California, and over the interior portions of the north Pacific coast. In all other districts the week averaged warmer than usual, being decidedly warm from the central Rocky Mountain districts eastward over the central valleys and upper Lake region. The excess in the Atlantic coast districts was generally very slight. Very heavy rains fell in central and north-eastern Texas, northern Louisiana, over the greater part of Arkansas and western Tennessee and northern Mississippi. Generally well-distributed rains occurred in portions of the Missouri, Red River of the North, upper Mississippi and Ohio valleys and Middle Atlantic States. Less than the average amount generally fell throughout the South Atlantic and east Gulf States, over most of the Lake region, and in portions of the lower Ohio, central Mississippi and lower Missouri valleys.

Week ending August 11. — The week averaged cooler than usual in the northern districts from the Rocky Mountains eastward to the New England coast. The week also averaged slightly cooler than usual on the central and southern California coasts and on the west Gulf coast in the vicinity of Galveston. Generally throughout the Southern States, including the southern portion of the Middle Atlantic States and the Ohio valley, the week averaged warmer than usual. Heavy rains fell in Oklahoma, south-eastern Kansas, portions of Missouri, Iowa, Illinois and Indiana, and over a large part of the middle and south Atlantic coast districts. Over the greater part of the Gulf States the rainfall was less than average, and there was also less than usual over the greater part of the Lake region and portions of the upper Missouri and Mississippi valleys.

Week ending August 18. — The week was decidedly cool throughout the Plateau region and most of the Pacific coast, and also from the Missouri valley eastward to the New England and middle Atlantic coasts. Over the eastern Rocky Mountain slope and throughout the Southern States the week averaged warmer than usual. No appreciable amount of rain fell in Texas, and only very light showers over limited areas in Arkansas, Oklahoma, southern Kansas, south-western Missouri, and portions of the central Gulf States and lower Lake

region. Excessively heavy rains occurred over an area extending from southern Minnesota and north-western Iowa south-eastward to the lower Ohio valley, Iowa and northern Illinois receiving the most. More than the usual amount of rainfall was also reported from the New England coast districts.

Week ending August 25. — The week was warmer than usual in the Southern States and over the eastern Rocky Mountain slope, southern Missouri valley, and eastern portion of the southern Plateau regions. The week was cooler than usual over the greater part of the Pacific coast and Plateau regions, and from the lower Missouri and upper Mississippi valleys eastward to the Atlantic coast. Nearly the whole of Texas and a large part of the central and east Gulf districts received no appreciable rainfall. There was also a general absence of rain over a considerable part of the Middle Atlantic States, and less than the average over most of the Lake region and New England. Generally throughout the Missouri and in the central Mississippi and lower Ohio valleys the rainfall exceeded the average, being excessively heavy in the eastern portions of Nebraska and Kansas. Little or no rain fell in the Rocky Mountain and Pacific coast districts.

Special Telegraphic Reports.

[Weather Bureau, Boston.]

Week ending July 28. — New England. Boston: Cloudy, showery weather, generally unfavorable to harvesting and injurious to some grain in shock; crops made normal growth; grain good, except corn, which is still backward; tobacco, vegetables, apples and peaches promising well; berries good crop; sunshine much needed.

Week ending August 4. — New England. Boston: Weather favorable for crop growth and harvesting; corn in good condition, making rapid growth; vegetables excellent, except squashes; melons not satisfactory; potatoes good, but indications that blight and rot may lessen yield of late crop; peaches and apples excellent; pears below average; tobacco excellent, some topping done.

Week ending August 11. — New England. Boston:

Weather favorable for crop growth, but showers retarded harvesting and damaged hay; corn much improved and fairly promising; small grain good; apples good, but dropping somewhat; peaches and berries good; plums and pears uneven; tobacco topping progressing, crop promising; potatoes doubtful, owing to blight and some rot, but fairly promising; other vegetables good.

Week ending August 18. — New England. Boston: Weather very favorable, except too cool; excellent progress with harvesting hay and oats, large yield; garden vegetables good; potatoes average, but blight and rot causing some damage; tobacco excellent, but second cutting somewhat damaged by wind; apples probably above average; peaches and pears promise average crop; cranberries very promising.

Week ending August 25. — New England. Boston: Weather favorable, except too cool; haying completed, except in parts of north, good crop; early potatoes good, late uncertain on account of blight and rot; apples and cranberries promise average yields; peaches fair; pears uneven; tobacco excellent.

Weather of August, 1902.

The month opened with several days of typical "dog-day" weather. The sky was partly overcast, with a large excess of humidity, light winds and calms, and temperatures ranging in the 80's. The rainfall during the time was light, except in some of the western sections of the States, where heavy local showers occurred. From the 6th to the 12th inclusive the weather was unsettled, showers and local storms were prevalent, and the rainfall in some localities was considerably in excess of the average. The temperature during the time was quite uniform, rising but little above 80 degrees, and the daily means ranged from 1 to 3 degrees below the weekly normal. The nights were especially cool, the temperature conditions being mostly unfavorable to vegetable growth. In coast sections fogs were of frequent occurrence, particularly during the mornings. A "spell" of fair weather, during which there was much sunshine, obtained from the 13th to the 18th. The temperatures, however, remained unseasonably low, the daily means ranging from 1 to 6 degrees

below the normal. The nights were cool, with fogs in low lands and along the coast. While there were no reports of frosts, the temperatures in some localities fell dangerously near the frost point. The weather during the remainder of the month was rather uneven. In some sections showers and thunderstorms were of frequent occurrence, while in others the weather was fair, with an average amount of sunshine. But for the whole State the temperatures were notably below the seasonal averages; the nights continued cool, and the mercury during the days seldom rose to 80 degrees. Summed up as a whole, the weather of the month was phenomenally cool, and, excepting the opening days, more like that usually experienced in September than in August. The rainfall of the month was generally deficient, although well distributed, and there was little if any complaint of dry weather. There was less than the usual amount of sunshine, but this was also fairly distributed through the month.

In the circular to correspondents returnable August 25 the following questions were asked: —

1. What is the condition of Indian corn?
2. What is the prospect for rowen, as compared with a normal crop?
3. What is the prospect for late potatoes, and have you noticed blight or rot?
4. How do the acreage and condition of tobacco compare with former years?
5. What is the prospect for apples, pears, peaches, grapes and cranberries?
6. What is the condition of pasturage in your vicinity?
7. How have oats and barley compared with former years?

Returns were received from 158 correspondents, from which the following summary has been made up: —

Indian Corn.

The cold nights and cloudy days of the month retarded the progress of the corn crop, making it even more backward at the date of making returns than at the opening of the month. Late-planted fields were about tasselling out

at that time, and on others the growth of the ears was very slow. An early frost would practically ruin the crop in all sections, and at the best at least a partial failure seems more than probable. The only chance for a full crop is that the month of September shall be unusually warm and dry, with no frosts until the close of the month. The crop is somewhat further advanced in eastern sections than in western, but not sufficiently so to ensure a crop with frosts in early September.

Rowen.

On early cut fields rowen promises to be a very heavy crop, and several correspondents report clover to be especially in evidence. So many fields were cut late, some even very recently, that it is hardly probable that the crop as a whole will be even an average one, though a warm September would probably bring about that result also. The frequent rains of the summer months have done much to put mowings in good condition for next season.

Late Potatoes.

Late potatoes were somewhat backward, but promised an excellent yield before the appearance of blight and rot. These diseases are generally prevalent in the four western counties, where they have already operated to cut down the yield materially, and have appeared in all the other counties, though not in nearly so marked a degree. Bright, clear weather may perhaps hold them in check, in which case a good crop may yet be secured for the State as a whole.

Tobacco.

The acreage of tobacco, as in the two preceding years, is reported as slightly increased. The crop is somewhat late, but is otherwise in fine condition, promising a heavy yield of fine, clear leaf, remarkably free from insect damage and imperfections. Cutting has been delayed by the backwardness of the crop and the recent rains, and will not be completed before the first week in September.

Fruit.

Apples are holding on the trees well, and promise a good crop, though not an extra one; but Baldwins will not yield as well as other varieties. The quality of the fruit promises to be very good indeed. Pears will be a very light crop. Peaches are, as usual, somewhat uneven, but the crop as a whole will not be far from an average one for this climate. Grapes continue to promise very well indeed. Cranberries are a light crop in the south-eastern sections of the State, particularly on the Cape, with more than usual complaint of damage from the fruit worm.

Pasturage.

Pastures are generally in excellent condition, frequent showers having kept them green and growing. The only exceptions are on the Cape and a strip a few miles wide on the immediate south-eastern coast, where they are greatly in need of rain.

Oats and Barley.

Oats are an exceptionally good crop, and promise to yield heavily in all sections. There is considerable complaint of lodging, making harvesting difficult. Barley is but little raised, except for forage. As a grain crop it does not appear to be more than average. Both are doing well as forage crops.

NOTES OF CORRESPONDENTS.

(Returned to us August 25.)

BERKSHIRE COUNTY.

New Marlborough (E. W. Rhoades). — Indian corn is very late, with a small growth of stalks. The prospect for rowen is good. Potatoes have made a good growth, but blight and rot will cut the crop short. Apples will be nearly an average crop; not many pears and peaches. Pastures hold good. Oats are a better crop than in former years.

Becket (Wm. H. Snow). — Indian corn is late, and is just silking out. The prospect for rowen is very good where haying was begun early. We have blight on potatoes, with some rot. Tobacco is not raised hereabouts. Apples will be a fair crop; not many pears; cranberries good. Oats and barley have compared well with former years, and oats in particular have made a big growth.

Lee (A. Bradley). — Indian corn is late, and about 15 per cent below the normal in condition. Rowen promises to be within 5 per cent of a normal crop. Blight has appeared on late potatoes, as well as some rot. Apples will not be more than 20 per cent of an average crop. Pasturage is in first-class condition. Oats and barley have been full crops.

Stockbridge (F. A. Palmer). — Corn is very late, a large part of it being late planted, and very small, owing to the cool weather. There will be less than an average crop of rowen, as haying was late on account of rain. The prospect for late potatoes is poor, with blight and rot both very prevalent. Apples will be a good crop, and peaches and pears fair crops. Pastures have been extra good, but are getting short now. Oats and barley made a large growth; early oats good; late ones badly lodged, and showing some rust; many cutting them for hay for that reason.

Hinsdale (T. F. Barker). — Indian corn is very backward, with short growth, and must be a poor crop. Rowen will not be an average crop, and must be much later than usual. Early potatoes are a very good crop; late ones almost a failure, owing to blight. There will be a very limited supply of apples and pears, no peaches and very few grapes. Pasturage is in very good con-

dition, and fall feed will be above that of the average season. Oats and barley seem to have made a good growth. The weather continues so rainy that our farmers cannot harvest their grain.

Lanesborough (Scott Jenks). — Indian corn is very backward. Rowen promises to be a good crop. Blight and rot is quite general on our potatoes. Apples will be a fair crop; pears a medium crop; peaches a good crop; no cranberries. Pasturage is in good condition. Oats and barley are fair to good crops; oats somewhat lodged.

Savoy (W. W. Burnett). — Corn is in very poor condition, small and uneven, and more than a month late. Rowen will be more than an average crop, compared with former years. Potatoes are looking well; early potatoes have shown blight, and the tubers are rotting. Apples are about a normal crop; other fruits little cultivated. Pasturage is in better than average condition, compared with former years. Oats and barley are fully average crops. Corn is so very backward it seems impossible for any of it to ripen.

New Ashford (Elihu Ingraham). — Indian corn is rather backward, but is coming along finely now. There will be a fair crop of rowen, and all meadows that have been mowed are looking fine. Late potatoes will be a very light crop, owing to blight and rot. Apples will be a fair crop; no other fruits raised. Pastures never looked better at this time of the year. Oats are a heavy crop; not much barley raised.

Williamstown (S. A. Hickox). — Corn shows a fair stand, but is three weeks late. Rowen promises a good crop, although some of the first crop is still standing. Potatoes promised a large crop, but half of them have rotted, and blight is very prevalent. Apples will be a half crop in this section. Pasturage is in fine condition. Oats are well filled out, and some fields are yielding as high as 65 bushels to the acre. It rains almost every day, and there is much hay to cut yet. Oats are lodging in the fields, waiting for weather to harvest them.

FRANKLIN COUNTY.

Monroe (D. H. Sherman). — Indian corn is very late. Rowen promises to be an average crop. Blight struck most fields of potatoes about August 1, and since that date from one-fourth to one-half of early planted potatoes have rotted in the fields. Apples fair; a few pears; some grapes and cranberries. Pasturage is in very good condition. Oats and barley are only raised for hay and green feed.

Hawley (C. C. Fuller). — Indian corn is late and poor. Rowen

will be more than an average crop where the first crop was cut early. Potatoes promise a large crop, but are affected by both blight and rot. Apples and peaches good; pears and grapes doubtful; cranberries not raised. Pastures are in good condition. Oats and barley are fair crops.

Shelburne (Geo. E. Taylor). — Corn is ten days late, and much below the average in condition. Rowen will be more than a normal crop. Late potatoes promise a fair yield; some blight, but no rot as yet. Apples are of fair quality, but there will be no surplus. Nights are so cold that crops cannot grow, and corn needs a month of good, warm weather.

Deerfield (Chas. Jones). — Indian corn is late, and will not be an average crop on wet land. Rowen will be a fair crop where the first crop was cut early. Potatoes are good, but blight has appeared on some fields, and a little rot also. Tobacco is a fine, clean crop, but is a little late. Apples and grapes fair crops; few pears and peaches. Pastures are in extra good condition for this time of year. Oats are an extra crop. All crops are looking fairly, but need more sun and warmer weather.

Whately (Frank Dickinson). — Indian corn is poor and late. Rowen will be above an average crop. Late potatoes promise a good crop, although there is some rot on a few fields. Acreage of tobacco full, and condition good. Apples good; few pears. Pasturage is in good condition. Oats are a heavy crop.

Sunderland (J. M. J. Legate). — Corn is very backward, and we must have a warm September to ripen the greater part of it. Rowen is above an average crop. Potatoes are looking finely, with no sign of blight or rot. There is an increased acreage of tobacco, and the crop in the fields never looked finer. Apples and pears are below average; grapes are looking well. Pastures are in fine condition, as there has been no lack of rain at any season of the year. Oats are looking well.

Montague (C. S. Raymond). — Corn seems to be earing well, but is so late it can hardly be called in fair condition. Rowen is in fine condition, and promises more than a normal crop. There is blight on all potatoes, but no rot to speak of. The acreage of tobacco is increased a third, and the crop promises to be the best for a number of years. Apples and pears about medium crops; peaches and grapes fair. Pasturage is in good condition. Oats and barley only raised for green feed.

Wendell (N. D. Plumb). — Indian corn is very backward. The first crop of hay was cut so late that there will be very little rowen. Farmers are complaining of blight and rot on potatoes. The apple crop is above the normal; peaches and pears fair aver-

age crops. Pastures are in good condition. Oats are a good crop so far as growth is concerned, but, owing to the wet weather, are good only for fodder, and very poor fodder at that.

Orange (A. C. White). — Cold, wet weather makes Indian corn small and backward. Rowen looks well on early cut fields, and is fully an average, on the whole. Late potatoes promise a good yield, but there is some complaint of rot. Apples, pears and grapes are extra good crops. Pasturage is in about average condition. Oats, barley and most of our corn is raised for forage and for the silo in this dairy region.

HAMPSHIRE COUNTY.

Prescott (W. F. Wendermuth). — The corn crop will be light, and much will not reach maturity. The prospect for rowen is good, especially on wet land. Late potatoes are looking well, but show some blight and rot. Apples, pears and grapes will be full crops; peaches a two-thirds crop; cranberries not grown. Pasturage is in very good condition. Oats and barley have been fully up to the average as forage crops. The fall web worm is working on apple trees quite extensively.

Pelham (J. L. Brewer). — Indian corn looks well, but is two weeks late. Rowen promises to be an excellent crop. There was an excellent outlook for late potatoes, but blight and rot have appeared. Apples and peaches are good crops; grapes and cranberries fair. Pasturage is in good condition. Oats are a very fair crop. We expect good crops if the frost holds off. Most of us have lately finished haying.

Amherst (H. M. Thomson). — Corn is two weeks late, but is doing well, except on wet land. Where hay was cut early, rowen will be above a normal crop, and it is starting well on late-cut fields. Potatoes promised a good crop, but most fields have blighted and are rotting somewhat. Tobacco will be late, quality below average, and weather bad for harvesting. Pastures are in good condition. Onions are late, but are doing well.

Granby (Geo. A. Blish). — Corn is backward, and does not promise an average crop. Rowen will not be quite as good as usual, on account of so much of the first crop having been cut late. We have both blight and rot on potatoes, and most of the crop will be dug and sold early. Winter apple trees are loaded with fruit; not much other fruit raised. Pasturage is rather short than otherwise. Oats and barley are about average crops.

Southampton (C. B. Lyman). — Some fields of corn are good, but the larger part are small, with few ears. Rowen is a fair

crop, and perhaps an average one. Yield and quality of potatoes good, but all have blighted and some are beginning to rot. The acreage of tobacco is somewhat increased, and the crop is fully up to the average in condition. Apples and pears will be good crops; few peaches; grapes a large crop. Pasturage is in fair condition for the time of year. There was a large crop of oats, which were mostly cut for hay.

Westhampton (H. A. Parsons). — Indian corn will be from one-half to two-thirds of a normal crop. Rowen is in first-class condition. Rot has commenced on about half the fields of potatoes. Tobacco is a three-fourths crop this season. Apples a three-fourths crop; pears, peaches and grapes half crops. Pasturage is in good condition. Oats and barley are not much raised.

Williamsburg (F. C. Richards). — Corn is backward, but is looking well, and if the season is long enough, it will be a good crop. Rowen is looking well and coming on well. Potatoes blighted badly, and show some rot. There is a slight increase in the acreage of tobacco, and it is looking well. Apples 80 per cent of a full crop; pears half a crop; peaches nearly a full crop. Pastures are in good condition. Oats are a good crop.

Chesterfield (Horatio Bisbee). — There is but little chance for corn to mature in this locality, and warmer weather is needed for a good crop of rowen. Potatoes are good, with but little blight or rot. There will be a fair crop of winter apples of good quality; but few pears, peaches or grapes. Pasturage is in good condition. Oats and barley are fair crops. The hay crop has not been a heavy one, although better than last year.

Cummington (S. W. Clark). — Corn is very late and uneven; the best shows a good growth. Where the first crop was cut early, rowen looks finely, but all was not cut in season. Potato tops show blight, but I have seen no rot. Peaches and cranberries not much raised; other fruit looks well. Pasturage has been very good all the season. Oats and barley have made a good growth, and will be mostly fed green. Our greatest trouble has been to cure our heavy hay crop, which is not all cut at this date, and we have had no hot weather yet.

HAMPDEN COUNTY.

Chester (C. Z. Inzell). — Indian corn is in poor condition. Rowen promises to be a good crop. Potatoes have made a very good yield, but are rotting somewhat. Apples will be a good crop. Pasturage is in good condition. Oats and barley are good crops.

Blandford (E. W. Boise). — The corn crop is late, and without

a warm September will be a failure as to grain, and the stover will also be light. Rowen is a very heavy crop. The potato crop gave good promise until lately, but now, on account of blight and much decay, it appears as if the crop would be small. Apples are hanging on the trees well, and are of good size and fair; Baldwins not as plenty as some other varieties. Pastures are in extra good condition, and stock is doing well. Horn flies are not troubling stock as much as usual.

Southwick (L. A. Fowler). — Indian corn is below an average crop. Rowen is a good average crop. Have not seen much blight or rot on potatoes, but some is reported. Apples good; other fruits below average. Pasturage is in very good condition. Oats and barley very little are raised for grain.

West Springfield (T. A. Rogers). — Indian corn is looking well, but is ten days late. Rowen is fully up to an average crop. Blight has appeared on nearly all potatoes, and there are some signs of rot. There is a small increase in the acreage of tobacco. Apples about an average crop; pears and peaches below an average; grapes good. Pasturage is looking well for the time of year. Oats have done well, but are mostly cut green for hay.

Chicopee (R. W. Bemis). — Indian corn is in good condition, although the crop may not ripen quite as early this year as usual. Rowen is better than an average crop. Early potatoes yielded well. Acreage of tobacco large, and condition good, compared with former years. Apples, pears, peaches and grapes good. Pastures are in fine condition. Oats, barley and rye are fine crops.

Wilbraham (H. M. Bliss). — The wet weather is very unfavorable for corn. Rowen promises to be nearly a normal crop. Potatoes are suffering from blight and some rot. A good deal of hay has been spoiled by the rainy weather. Apples a fair crop; pears 70 per cent; peaches and grapes full crops; cranberries nearly a full crop. Pasturage is in good condition. Oats are a good crop.

East Longmeadow (J. L. Davis). — Early planted corn is good; late planted and on wet land very poor, almost a failure. Rowen promises to be a fine crop. Late potatoes are making a fair yield, with much blight and rot. There will be a full crop of all kinds of fruit. Pasturage is in good condition. Oats are a full crop; not much barley raised.

Monson (F. D. Rogers). — Indian corn is very backward. Where the first crop was cut early, rowen will be heavy. Potatoes have made a large growth of tops, but some fields are blighting. Winter apples are developing finely, about 80 per cent. of a full

crop; pears and peaches light; grapes rotting badly. Pastures are holding out well. Oats were better than usual, but were mostly cut for hay.

Holland (Francis Wight). — Indian corn is very backward, and will have to develop rapidly to ripen before frost comes. Rowen is more than an average crop. Late potatoes are a fairly good crop, with little blight and no rot. Fruit of all kinds, except perhaps pears, will give good yields. Pasturage is in A No. 1 condition. Oats and barley are fully up to average crops.

WORCESTER COUNTY.

Dudley (J. J. Gilles). — Indian corn is making a slow growth in most cases, but is otherwise in fair condition. The prospect for the rowen crop is very good. There will be a fair crop of late potatoes, although blight has occurred in a few cases. There will be a full crop of apples, pears, peaches, grapes and cranberries. Pasturage is in excellent condition. Oats and barley compare favorably with former years.

West Brookfield (L. H. Chamberlain). — Indian corn is very backward, but a little fine weather and late frosts will make a fair crop. The prospect is good for late potatoes, with no blight or rot as yet. Rowen will be a fair crop. Apples, pears, peaches and grapes are good crops; no cranberries. Oats and barley are full normal crops.

Oakham (Jesse Allen). — Early planted corn is in good condition; late planted is very small and backward. There is the prospect of an excellent crop of rowen. Late potatoes promise to be a good crop, with no blight or rot as yet. Apples and grapes are abundant; very few pears, peaches and cranberries. Pasturage is in excellent condition. Oats and barley are better than average crops.

Barre (J. L. Smith). — A few fields of corn are very fair, but most are uneven and backward. Rowen will be a very good crop on fields that were cut early, but many were cut late. Late potatoes will be an extra good crop, if rot does not strike them. There will be an average crop of apples of extra good quality. Pastures are in extra good condition. Oats and barley are extra fine crops.

Dana (E. A. Albee). — Indian corn is small and late. There will not be much rowen, on account of the hay crop being cut late. The prospect for late potatoes is good, but there is some blight. Apples half a crop; also pears and grapes; no peaches or cranberries. Pasturage is in very good condition. Oats and barley are full crops, but were mostly cut for fodder.

Templeton (Lucien Gove). — I never saw corn so backward, and the prospect of its maturing is not favorable. On early cut fields the outlook for rowen is quite good, but much grass was cut very late. Potato tops are rank where not struck with blight; some rot in places. Apples rather light; few pears; no peaches; grapes fair; cranberries not raised. Pastures are holding out in good condition, owing to frequent rains. There is a full average crop of oats; barley rather light, owing to cool, wet weather. The season has not been a favorable one for squashes, beans or tomatoes.

Gardner (A. F. Johnson). — Indian corn is very late, and is not an average crop to date. Rowen will probably not be an average crop, as much hay was cut too late for the second crop to mature. Late potatoes look well; none dug yet; no blight. There is a good crop of apples, and they seem to be of good quality. Pasturage is in good condition.

Ashburnham (E. D. Gibson). — The condition of Indian corn is the worst in many years; will mature very little grain, many acres not a bushel. Rowen will be a good crop, though late, haying being still unfinished. The potato crop will not be heavy, and blight is commencing to show itself. Apples fair; pears few; peaches, grapes and cranberries good. Pasturage is in good condition. Little barley is raised. Oats are an extra crop, the best in years. I never saw the fall web worm so abundant; they cover apple and pear trees, blueberry and even hardhack bushes.

Princeton (A. O. Tyler). — Indian corn is backward. Rowen will be a good average crop. Late potatoes are looking finely. Apples are a fair crop; pears light; peaches, grapes and cranberries good. Pasturage is in very good condition. Oats and barley are about normal crops.

Harvard (J. S. Preston). — Corn is looking well, but is late; two weeks behind, owing to cold weather. A large crop of rowen can be secured. Late potatoes are looking well, and a large yield is expected. There is a good crop of fall apples, Baldwins not half a crop; peaches a good crop; pears light; grapes and cranberries not made much account of about here. Pastures are looking very well, much better than usual at this season. Oats and barley are only raised for fodder.

Shrewsbury (Fred J. Reed). — Corn is looking fairly well, but has not eared out much as yet. Rowen is looking well. Late potatoes are looking well, and I have noticed no blight or rot. The prospect for apples is good; very few pears or peaches. As a general thing, pastures are looking quite good. Oats and barley are better crops than usual.

Worcester (H. R. Kinney). — Corn is very late, but is making a good growth now. Rowen promises to be rather better than an average crop. Late potatoes have grown well, but have blighted somewhat. Apples and peaches are better than average crops; grapes fair; pears light. Pasturage is in better than average condition. Oats and barley made fair growth, but most of them were cut green, and some badly damaged by wet weather after cutting. The season has been so cool and cloudy that most crops are very late; but if the fall is favorable, the returns may be up to the average.

Auburn (Wm. Gilbert). — Every indication is that corn is going to be a very poor crop, on account of so much wet weather. Rowen will be about normal, though, if the first crop had been cut early, it would be a heavy crop. Potatoes are rotting badly in some places. Apples good; pears light; peaches and grapes good. Pastures are in very good condition. Oats and barley are very heavy crops. Pears seem to blight badly in some places.

Hopedale (Delano Patrick). — Indian corn is very backward, but is otherwise looking well. Rowen will be much better than an average crop. There is a good yield of late potatoes, but some manifestations of blight. Early apples are plenty, winter apples rather a light crop; pears a fair crop and grapes a heavy crop. Pasturage is in uncommonly good condition for August. Oats and barley are not much raised.

Uxbridge (Augustus Story). — Indian corn is backward, about two weeks behind in growth. Rowen will be a normal crop. Late potatoes are not up to a normal yield, and rot has appeared in some sections. An abundance of apples is promised, and other fruits are very good. Pasturage is in good condition. Oats and barley have done well in growth, but are hard to cure. The temperature has been very low for the season.

MIDDLESEX COUNTY.

Sherborn (N. B. Douglas). — Indian corn has a fair stand and color, but is very backward. There is about an average crop of rowen, with a larger share of clover than commonly. Late potatoes have made a good growth and yield, but show much blight and some rot. Apples 80 per cent of a crop; pears 10 per cent; peaches 80 per cent. Pasturage is in unusually good condition. Oats and barley are good crops, but are only grown for forage. Nothing but a warm September will give us a crop of corn; many pieces not yet tasselled.

Marlborough (E. D. Howe). — Indian corn is from two to three weeks late, but is of good color. Rowen will be a full crop. Late potatoes never looked better, with no blight and few potato bugs. Apples 80 per cent of a full crop; pears 50 per cent; peaches 75 per cent; grapes 100 per cent. Pasturage is as good as it ever is at this time of the year, but feed is not as fresh as in the spring. Baldwin apples are not plenty. Oats and barley are full normal crops.

Maynard (L. H. Maynard). — Indian corn is late, and below the average in quality, with an unusual amount of smut. Early cut fields will yield an average crop of rowen; but, owing to wet weather, many fields were cut too late to have much rowen unless the fall is very late. Potatoes are looking exceptionally well. Early apples are in full supply, late varieties about 60 per cent of a full crop and many are poor in quality; pears short; peaches small and late; grapes plenty. Pasturage is unusually good, owing to frequent rains. Oats and barley are average crops.

Littleton (Geo. W. Sanderson). — Corn has made a very good growth, but will require considerable sunshine and late frosts for its maturity. Rowen is more than an average crop. Late potatoes are looking well; some indications of blight, but very little rot. An average crop of apples, and looking well; fair crop of peaches and grapes; small crop of native cranberries. Continued wet weather has kept pastures in good condition. There is a good crop of oats and a small crop of barley. An increased acreage of corn for the silo is grown over former years, most of which is looking well.

Groton (Jas. P. Fitch). — Indian corn is in good condition where sufficiently fertilized. The prospect for rowen is better than usual. No blight or rot has appeared on potatoes. Baldwin apples scarce; no pears; peaches and grapes plenty. Pasturage is in excellent condition. Oats are a better crop than usual.

Dunstable (A. J. Gilson). — Indian corn is in good condition, but some fear it will not ear well. Rowen will be above a normal crop. Late potatoes promise well, although blight has been noticed in some places. Apples promise a medium crop; pears and peaches scarce; grapes and cranberries very light. On account of the abundance of rain, pasturage is in good condition. Oats compare well with former years; no barley raised.

Billerica (Geo. P. Greenwood). — Indian corn is maturing very slowly and earing unevenly. Late potatoes are looking well, but some fields are rotting. Early apples plenty, Baldwins half a crop and of uneven quality. Pasturage is in good condition. Oats

and barley are little raised in this vicinity. Very few pears; peaches plenty but small; fair crop of grapes; cranberries below the average.

Bedford (Henry Wood). — Indian corn is in very good condition. Rowen promises to be a fair crop. Late potatoes are coming on well. Apples are a fair crop; pears and peaches light crops. Pasturage is in good condition. Oats and barley are about average crops. Blight and rot have not appeared on potatoes, but the white grub is working considerably in places.

Burlington (C. E. Marion). — No Indian corn is raised here. The prospect for rowen is not very good. Late potatoes are looking well, with no blight or rot. The prospect for apples is good; few pears; no peaches or cranberries. Pastures are looking well. Oats and barley are looking well. All kinds of vegetables are looking finely. Onions have blighted in some places. The cool weather is keeping corn and squashes back.

Woburn (W. H. Bartlett). — Very little Indian corn is raised; all sweet corn for market is late and not earing well, ears not filling out, and less in quantity than usual. Rowen is not as good as was expected, being a short growth. Late potatoes promise well at present, with no blight or rot. Apples are a two-thirds crop; few pears and peaches; grapes only fair. Pasturage is in fair condition. Oats and barley are possibly a little better than average crops. Hungarian grass has not done as well as usual. Squash vines look well, but are setting very little fruit; also tomatoes.

Winchester (S. S. Symmes). — There will be a heavy crop of rowen. Potatoes are an extra good crop, with no rot as yet. Heavy crop of apples, peaches and grapes; about half a crop of pears. Pasturage is in fine condition, the best it has been this season. The weather has been cool, with many showers, and the nights really cold. The prospect for a crop of squashes is poor. Tomatoes are ripening slowly.

Lincoln (C. S. Wheeler). — No Indian corn grown; sweet corn is very backward. Rowen promises to be a good crop. The prospect for late potatoes is good; very little blight as yet. Fall apples are good, Baldwins half a crop; other fruits average. Pasturage is in fair condition where the bushes are kept down. Oats and barley are less planted than usual, except for late feeding.

Newton (Otis Pettee). — Corn is looking finely, with every prospect for a good harvest, though it is a little backward, owing to the cool season. There will be a full crop of rowen, which will in a measure compensate for the short crop of hay. Late potatoes

are doing well, with no signs of blight or rot as yet. Thrifty apple trees are well laden with fruit, and pears are doing fairly well. Pastures are in very good condition.

ESSEX COUNTY.

Amesbury (Fred W. Sargent). — Indian corn is very backward, and fully four weeks is needed for it to approach maturity. Where the first crop was cut early there is a good crop of rowen, but it is hardly normal, taken as a whole. Late potatoes are a good crop, only one case of rot having appeared. Apples are plenty, with the exception of Baldwins; pears light; some peaches; grapes plenty. Frequent rains and cool nights have kept pastures better than for some years. Oats are above average crops; very little barley raised. Most unseasonable weather ever known, haying been hardly completed at this time. Salt hay is a light crop and very green, but a large acreage has been harvested during the past ten days. Much corn intended for grain will have to be siloed, unless remarkable weather comes in September. Garden truck plenty and prices generally low; fall apples almost a drug on the market.

Newbury (Geo. W. Adams). — Indian corn is very backward. There will be a normal crop of rowen, but later than usual. Prospect good for late potatoes; a little blight, but no rot as yet. Apples are one-fourth of a full crop; pears 20 per cent; peaches and grapes full crops; cranberries a three-fourths crop. Pastures are in from fair to good condition. Oats are not a good crop, hardly average.

North Andover (Peter Holt, Jr.). — Indian corn is very poor and late. There is a good prospect for rowen where the hay was cut early. Potatoes are an extra good crop, with no blight or rot as yet. There will be a large crop of apples, except Baldwins; also of pears, peaches and grapes. Pasturage is as green as in June. Oats and barley are not grown except for fodder, and much of that has been ruined by the wet weather.

Andover (M. H. Gould). — Indian corn is a good crop for fodder, but is late for caring. Rowen promises to be above an average crop. The prospect is good for late potatoes, and no blight or rot has appeared. Apples good; few pears; peaches abundant; grapes and cranberries good. Pastures are above the average in condition. Oats and barley are larger crops than in former years. The cold nights of the last fortnight have kept corn back badly.

Wenham (N. P. Perkins). — Indian corn is not much grown,

but what there is is looking well, though a little backward. On well-manured fields that were cut early there will be a fair crop of rowen, but not much on other fields. The prospect for late potatoes is not good, as there is considerable blight. There is a good crop of fall apples, but Baldwins are not very plenty; pears are quite scarce; peaches are more plentiful than usual; not much prospect for cranberries. Pastures are not yielding much feed now, and milk cows are fed largely at the barn. Oats and barley are little raised except for fodder, and were about average crops. The season has been a cool one, and some crops are backward, especially onions, corn and tomatoes.

Manchester (John Baker). — Indian corn is in very good condition. Rowen promises to be a good crop. There is prospect of a good crop of late potatoes, although a little blight has appeared. The prospect is fair for all kinds of fruit. Pasturage is in good condition. Oats and barley are about average crops.

NORFOLK COUNTY.

Cohasset (Philander Bates). — Indian corn is not raised extensively, but the few acres planted are in good condition. Rowen promises an average crop. Late potatoes are a good crop, and blight and rot have not appeared. The prospect for apples is good; pears a light crop; other fruits not raised to any extent. Frequent showers have kept pastures in fair condition. Oats and barley are not raised to any extent. Farming, except for the summer markets, is not carried on to any extent here.

Avon (S. Frank Oliver). — The present outlook for corn is fairly good, but it needs warm weather badly. Rowen does not grow well, although it looks well. Potatoes are looking extra well, with no blight or rot as yet. Apples are very plentiful; pears, peaches and grapes scarce. Pasturage is in a little better condition than usual for this time of year. Crops generally have done and are now doing well, but the lack of good, warm weather retards the growth of everything.

Stoughton (C. F. Curtis). — Indian corn is at least two weeks late, and with the present weather will be very late for the silo, with few ears. Where the grass was cut early, rowen will be better than normal crop. Potatoes are doing finely, with little blight or rot. Apples are about 80 per cent of a full crop; pears 40 per cent; peaches 75 per cent; grapes 125 per cent; cranberries 70 per cent. Pasturage could not be better, with rain every few days all summer. Oats have done better than for many years.

Canton (E. V. Kinsley). — Corn is very thrifty, but backward; all fodder has made great growth. Rowen promises to be a full crop. Late potatoes look prime, with no blight or rot as yet. Apples, grapes and cranberries will give full crops; pears and peaches light. Pasturage is only in fair condition. Oats and barley are about average crops. Vegetation has made luxuriant growth, but the cool nights have retarded ripening.

Walpole (E. L. Shepard). — Corn is late and backward. Rowen is a very good crop, but is not up to ordinary years. Late potatoes look well and I have not noticed blight or rot. Apples good; pears and peaches half crops; grapes fair; cranberries light. Pasturage is rather short, but better than in ordinary years. Oats and barley are about average crops.

Norfolk (A. D. Towne). — Indian corn is two weeks late, but otherwise looks well. Where the first crop was cut early there is a good prospect for rowen. Late potatoes look well, although a few have blighted. Apples are a full crop; pears light; peaches and grapes good. Pasturage is in better condition than usual. Oats for forage have given a fair crop.

Millis (E. F. Richardson). — Indian corn is very backward. The prospect for rowen is good. Potatoes promise a good crop, with no blight or rot as yet. Apples and grapes will give big crops; pears and peaches fair; cranberries poor. Pasturage is in fair condition. Oats and barley have made better than average yields.

BRISTOL COUNTY.

Easton (H. M. Thompson). — Corn is making good headway, and, although a trifle late, will be a good crop. Good weather conditions will make rowen compare very favorably with a normal crop, the clovers in it being much more pronounced than usual. Notwithstanding the blight and white grubs, late potatoes will be a good crop. Apples are filling out well, and will be plenty; pears very light; peaches promised well, but of late have remained at a standstill, the fruit seeming to refuse to develop; grapes fair; cranberries promise well. Pasturage is in fair condition. Oats and barley are good crops. The raising of cucumbers under glass here seems to be a growing business, over 2,000 feet of houses being in operation, with more promised at East Mansfield.

Attleborough (Isaac Alger). — Indian corn is in good condition. Rowen promises to give a good crop. Potatoes a fine crop. Apples and grapes are abundant, but cranberries will be a small crop. Pasturage is in excellent condition. Oats and barley are full average crops.

Norton (Wm. A. Lane). — Corn is looking well, and promises to develop into a good crop. The prospect for the rowen crop is very good. Late potatoes are doing well, and we have not seen any blight as yet. There will be good crops of apples and peaches, but no pears. Pastures are in fair condition. Oats and barley are about average crops, when compared with former years.

Raynham (N. W. Shaw). — Indian corn is good, but is late. Rowen will be more than an average crop. The prospect is good for late potatoes, and we have seen no rot. Apples good; pears few; peaches not plenty; grapes and cranberries good. Pasturage is in good condition. Oats and barley are not quite average crops.

Westport (A. S. Sherman). — Corn is in fair condition, considering the cool nights and fair weather. Rowen will be a very light crop. Late potatoes are a very good crop; some blight and rot, but not much. Apples, peaches and grapes are abundant; pears and cranberries scarce. Pastures are nearly dried up, except on very low lands. Oats and barley are as good crops as have ever been grown here. White grubs are eating the meadows badly, and are making bad work with potatoes. Turnips and cabbages are doing well. Milk is getting scarce, on account of the scarcity of feed.

Dartmouth (L. T. Davis). — We have had little rain in this section for the past month, which causes the corn to roll badly on dry land, and may shorten the crop. Most of our potatoes have been dug, and have yielded very well. The prospect for rowen is very poor, owing to lack of rain. Apples will be a three-fourths crop; pears a one-fourth crop; peaches 80 per cent of a full crop. Pasturage is very short, and mowings that are fed down do not start again. Oats and barley are about average crops.

PLYMOUTH COUNTY.

Brockton (Davis Copeland). — Corn is looking quite well, but the ears grow slowly, owing to cold nights. Rowen will be about an average crop. Late potatoes will be a good crop if they do not rot, but blight has appeared upon the earlier fields. Apples, pears and grapes will give good crops; peaches poor and small. Pasturage is in fairly good condition. Oats and barley are not much raised, but appear to be rather light crops where grown.

Hanson (Dr. F. S. Thomas). — Indian corn is in good condition. There will be more rowen cut than usual. Late potatoes promise a large crop, with but little blight or rot as yet. The prospect is good for all kinds of fruit. Pastures are in first-class condition. Oats and barley are but little raised hereabouts.

Halifax (G. W. Hayward). — Corn looks well and is heavy;

if it were the first of August, we should expect a good crop, but the cold weather has retarded the ear growth so that it is not much farther advanced than it should normally be at that time. Where grass was mowed early there will be a good crop of rowen. Late potatoes have blighted, but will be a good crop if rot does not set in. Apples and cranberries will be average crops; not many pears. The rains have helped pastures some, but in this vicinity they are not worth much, at the best. No oats or barley are raised except for fodder, and for that purpose they are a good average crop.

Plympton (Winthrop Fillebrown). — Indian corn is very far behind the season. Rowen will probably be better than usual. Late potatoes that have been sprayed look well, but blight has destroyed the crop with some. There will be a good apple crop; pears fair; occasional single peach trees have done well; cranberries a light crop. Pastures are rather above the average in condition. This has been a good season for barley, but oats have not filled out well.

Kingston (Geo. L. Churchill). — Corn is rather backward, but otherwise looks well. There will not be as good a crop of rowen as ordinarily. Late potatoes look fairly well, with no blight as yet. There will be a fair crop of apples, pears, peaches and grapes; cranberries a small crop. Pasturage is in very fair condition for this time of year. Oats and barley are very fair crops.

Wareham (A. B. Savary). — There is very little Indian corn raised here, but what there is looks quite well. The rowen crop will be light. Potatoes look well, and I have seen no rot. Apples fair; few pears or peaches; cranberries fair. Pasturage is quite badly in need of rain. Oats and barley are not raised, except a few oats for hay. The ground needs a good, soaking rain, as we have very few showers in this locality, about all of them going to the north of us.

BARNSTABLE COUNTY.

Bourne (D. D. Nye). — Indian corn is in fair condition. The prospect for rowen is very good, better than last year. Late potatoes promise a very good crop; no blight or rot so far. Apples will be a small crop; no peaches; some pears and grapes; cranberries better than last year. Pasturage is in excellent condition. Oats compare favorably with last year. Late rains have made all vegetation look well.

Falmouth (D. R. Wicks). — Sweet corn is not earing well, and the corn worm is working badly. Rowen will be fully up to an average crop. Potatoes have blighted more or less, but there is very little rot. Apples are plenty and fair, with little worm work; pears few; peaches, grapes and cranberries good to fair. Pastures

never looked greener, but we need rain to keep them so, as they are now getting dry. Beans and tomatoes have blasted, and are killed outright; squashes are much the same, although the process is not so complete with them. Japanese plums are rotting on the trees just as they commence to color, and early peaches have done the same; the later ones look finely now.

Mashpee (W. F. Hammond). — Indian corn is below the average in condition. Rowen will be above an average crop. The prospect is good for late potatoes; have not heard of blight or rot. There will be an average crop of apples, pears and grapes, and a two-thirds crop of cranberries. Pasturage is above the average in condition. There has been an average crop of oats.

Barnstable (John Bursley). — Indian corn is very small. There will be no rowen at all. The prospect for late potatoes is good, with no blight as yet. Apples will be an average crop; pears light; peaches fair; grapes good; cranberries light. Pasturage is very short. Oats are much more than an average crop. It has been very dry here since the middle of July. Cranberries will probably not be over one-third of the crop of 1901.

Harwich (A. N. Doane). — Indian corn is in fair condition. The prospect for the rowen crop is unfavorable. Late potatoes are in fine condition, with neither blight nor rot. Apples good; pears poor; peaches fair; grapes good; cranberries half a crop. Dry weather has about destroyed the pasturage. Oats and barley are about average crops. The fruit worm is doing considerable damage to cranberries, and the crop in Barnstable County will be much smaller than last year.

Chatham (E. Z. Ryder). — Corn is somewhat backward, owing to the cold season. Rowen will be somewhat less than an average crop. Late potatoes are looking finely, with no blight or rot. Apples, pears, peaches and grapes will be average crops, but cranberries will be below the average. Pastures are somewhat dry, but otherwise in fair condition. Oats are more than an average crop; barley, very little raised here. There is some complaint among the cranberry growers that a new worm, large in size, is attacking their bogs, taking vines and fruit. The sections taken are ruined, as they eat everything clean to the ground.

DUKES COUNTY.

West Tisbury (Geo. Hunt Luce). — Indian corn is backward. Rowen promises to be above an average crop. The prospect for late potatoes is that there will be a large crop, although there is a slight amount of blight and rot. Grapes and apples are good crops. Pastures are in good condition. Oats and barley are above average crops.

BULLETIN OF

MASSACHUSETTS BOARD OF AGRICULTURE.

SOME INEXPENSIVE WAYS OF MAKING FARM POULTRY MORE PROFITABLE.

By John H. Robinson, *Editor Farm-Poultry, Boston, Mass.*

In the issue of this bulletin for August, 1901, I urged upon the farmers of Massachusetts the importance of poultry keeping as a branch of diversified farming. In this paper I want to show some ways of making poultry keeping more profitable than it usually is when so conducted, giving attention especially to the possibilities of improving stock and increasing profits with comparatively small expenditure of either money or labor.

First and most important of these is the application of the principle of selection, — the great first principle in the breeding of all kinds of live stock.

Perhaps we can arrive at a better appreciation of the use we as poultrymen can make of this principle, if we take space here to consider briefly some differences between natural selection as it operates in the evolution of wild animals and plants, and artificial selection as it is used in the culture of domestic plants and animals. Natural selection operates very slowly; to accomplish marked results, it requires long periods of time. Artificial selection, when intelligently directed, advances along the lines marked out for it with a rapidity which often appears little short of miraculous. But natural selection moves steadily onward, and is not easily deprived of its gains; while the gains quickly made by artificial selection are as quickly lost, unless great care is exercised to prevent such loss.

It is because close selection is required to maintain as well as to make development that every poultry keeper needs to be fully awake to the importance of selection as an every-day, working

principle. Many seem to appreciate the necessity of careful selection to develop a breed and bring it up to a certain standard, but not to realize so well that just as careful selection is required to keep a flock of thoroughbred fowls up to the average of improved stock of their kind. This is because they do not realize how highly artificial is the development of all improved races of fowls; how, under the unrestrained influence of natural selection, these fowls would have developed quite differently; and how the natural tendencies begin to assert themselves the moment the breeder relaxes in the least his effort to keep his stock at the highest point of development.

Natural selection is, as a rule, unable to make use of marked deviations from established types, or to preserve variations which, however desirable in themselves, would diminish a fowl's chances of living and perpetuating its kind. Artificial selection is not so limited. Almost the only limitation imposed upon it is when excessive development of one quality or characteristic destroys, as it were, the equilibrium of the organism as a whole. Even under such abnormal conditions, it can often be carried to an extreme which, when we consider the original development of the feature concerned, is simply wonderful. Many of the features most prized by those who value fancy points first, and some of those most valued by those who keep fowls for economic purposes, could never have been developed under natural conditions. Of such are the abnormal developments of comb and crest in Minorcas and Houdans, and the extremely long and abundant feathers on some of the Asiatics. To the farmer who sees them, these monstrous developments are usually objects of ridicule; yet in one way at least they may be useful to him. From the possibility of maintaining these extreme forms the poultry breeder who keeps to more rational lines may be convinced of the certainty that he can get and keep any reasonable degree of development of a feature or quality which he desires in his stock.

We may be able to get a still better — a broader — idea of the value of this principle of selection, if we reflect on how well and how quickly the work of making the breeds which we now group together as the American class was done. These are what are called "made" breeds. In one sense, all breeds are made breeds; but we don't know that any one ever deliberately went to work to make the Light Brahma, or the Black Spanish, or the Dorking, or the Houdan, while these American breeds, with a possible exception, were "made to order." The Barred Plymouth Rock, the oldest of them, has been before the public only about thirty years.

Varieties so widely popular as the White Wyandotte and the

White Plymouth Rock were very new ten or twelve years ago. Buff Plymouth Rocks and Buff Wyandottes may be said to have been made within ten years; and the exhibition Rhode Island Red is of even more recent manufacture. In developing all of these varieties the elementary rule has been: careful selection of breeding stock, for the purpose of producing fowls of a certain ideal type, which ideal type, though not uniform in the minds of all the breeders, was far more uniform than the fowls themselves, and very much in advance of the actual results obtained.

Coming now to the direct application of the principle of selection in poultry breeding to methods of farm poultry keeping, let us begin with the consideration of the conditions on farms — that is, on ordinary farms.

There are a great many farm poultry keepers who, while recognizing the uses of selection, do not see how necessary it is that they should take specific measures to insure that a right selection is actually accomplished.

It is often said that natural selection is constantly working for the improvement of every stock of poultry, even when the owner makes no special efforts for improvement. It is argued that, as the best and most vigorous males fertilize the most eggs, and the best hens lay the most eggs, the greater part of the chicks produced each year must necessarily be from the best of the stock; and thus there will be constant improvement. This looks plausible, but the argument goes to pieces as soon as we begin to examine it.

To my mind, a sufficient answer to it is found in the fact that flocks of poultry left to improve in that way invariably deteriorate, or at the very best show no perceptible improvement. But everyone may not agree as to the weight of that fact as an argument; so, to any who disagree with that, I offer another argument, which I think they will admit is reasonable, which will show how unlikely it is that natural selection, acting as indicated, should have any considerable influence in improving a farm flock.

In the first place, the poultry keeper who does not carefully reserve his best birds rarely breeds from the best of any year's produce. His earliest and best pullets and cockerels go to market, because they bring best prices when sold for table consumption. And, even if the flock does each year contain some of the best of the produce of the preceding year, it is by no means certain that the greater part of the chicks from the flock will be from unions of best males with best females, or that the best birds will give the most numerous progeny. It often happens that an inferior male is a much surer breeder than one vastly his superior in all points the poultry keeper prizes. Then, as to the hens: in the case we are

supposing, the best-developed pullets and best-conditioned hens lay earliest, and generally begin laying a long time in advance of the hatching season. As a rule, these are the first hens to go broody, and — broodies being always in demand early in the season — they will almost certainly be used to hatch and rear chicks. The eggs upon which they are set will not be their own eggs, laid when they were in full vigor, but eggs from the general flock. If any of their own eggs are among these, it is simply the tailings of the produce of that laying period. Under such circumstances, the best hens may hardly figure at all in breeding operations, and the chances are that very few of the chicks produced are from the best hens of the flock, and fewer still from any of these best hens at the time they were most fit for breeding.

When we note how often it happens that a breeder who carefully mates up a pen of choice fowls from which to sell eggs for hatching fails to get eggs from them when he wants them most, it seems absurd to suppose that, under a careless and hap-hazard system, this trouble would be avoided regularly enough to make improvement through natural selection. Natural selection, as has been said, does operate in the poultry yard; but, the lines of progressive development being largely artificial, its general tendency is to retard rather than to accelerate such development. Progress along the artificial lines of development, which have given to domestic plants and animals their peculiar value, may with truth be said to be always the result of design on the part of the breeder, — of design accomplished through intentional, intelligent and systematic selection. Wherever you find a really good flock of fowls, though they may be only mongrels, you will find that the man or woman in charge of them has some system of selection which will account for the excellence of the flock. It may not be as comprehensive and thorough as the methods of an expert and critical breeder, and will not make as great improvement or improve so rapidly, but it will at least save the flock from marked deterioration.

There are several ways by which a farm flock can be kept up to a very good standard of excellence for practical purposes, by just a little effort of the keeper. Thus, where it is the practice to take the eggs used for hatching from the general flock, if, besides reserving his best pullets, the keeper weeds out all the decidedly inferior ones, and uses only well-developed males, any one of which would be considered a desirable breeder, the stock cannot go back very rapidly, even though, as we have seen, there might not be enough of the product in any year from the best birds to strongly impress their quality on the flock.

It is such selection as this, accompanied by selection of the largest eggs for hatching, that is practised on most farms where some special attention is given the matter of making poultry profitable. It is doubtful whether any marked progress was ever made by such methods, but they are a long way in advance of leaving it all to nature. At best, these methods are crude; their use under the conditions described is illogical.

The logic of such a situation requires that a poultry keeper who realizes the importance of reserving his best fowls to breed from should make sure that it is only the eggs of his best hens, fertilized by his best males, that are used for incubation. The logic of the situation requires that a poultry keeper who thinks it worth while to select the best eggs for incubation should, sooner or later, come to consider it necessary to know that these eggs were from hens possessing the other qualities prized, and fertilized by males most suitable for mating with these particular hens. Selection is not complete if it stops short of the separation of the fowls selected, — unless the whole flock is select, — a thing which does not often happen. It is in failing to make selection complete and effective by separation that nine-tenths of the poultry keepers who do not breed for fancy points make one of their most serious mistakes. Separation would not be so necessary if the whole flock were needed to produce the number of chicks wanted. In that case, it would be simply a question whether the additional product secured by using the poorer as well as the better breeding birds would add to the profit. But, with the exception of those who sell eggs for hatching, there are few poultry keepers who could not get all the eggs needed for incubation from a small part of their flock. In that case, it certainly seems the best policy to use for breeding purposes only as many of the choicest of the flock as are really required. Then, even though it may sometimes happen that the best hens do not furnish eggs when most wanted, the poultry keeper can know that he is using the best eggs available, and using none from inferior hens.

Suppose that there is on a certain farm a flock of one hundred hens; that this is the amount of the laying stock usually carried; and that each year about three hundred chicks are raised. It would be possible to produce all these chicks from a half a dozen hens. That, however, would be much better than average results. A dozen hens can produce the eggs for these chicks, and do it handily. Is it not, from every consideration, better to have all the chicks from the twelve best hens than to have only ten or fifteen per cent. of chicks from hens of this quality and eighty-five or ninety per cent. from the rest of the flock?

Aside from the special poultry farms and the farms of farmers who are fanciers, there are few farms, either in Massachusetts or in any other State, where selection and separation of breeding stock is practised. Still there are a few, and their number is increasing; and it is very rare indeed to find any one who has given that method a fair trial going back to the old way of hap-hazard breeding. That way is too wasteful for people who need to be economical, as every one should be in poultry keeping; for profit in poultry depends very much on economy in production.

In the first place, the hap-hazard way involves those who use it in quite an expense for superfluous male birds. For one hundred hens there must, as a rule, be six or eight males; with a less number there may sometimes be good fertility in the eggs from the flock, but the numbers given are more common. Now, if only twelve of the hens are actually needed to produce eggs for hatching, one male is enough to fertilize their eggs. We may set aside another, to be held in reserve in case of an accident, or in case the male used in the breeding pen fails to give satisfactory fertility. All other males kept with the flock are superfluous. The poultryman who keeps superfluous males is "out" just the cost of their food, plus the difference between the price of soft roasters and the price of old roosters on each bird, — to say nothing of the occasional *dead* losses, resulting from quarrels of these pugnacious fowls. This is money that might be saved, or put where it would earn something.

A good way to use it is in the purchase of a male bird of superior quality. To most farmers the prices asked by poultry breeders for males that are what the farmer ought to have to improve his flock seem outrageous; yet, even at the high prices at which they are held, such birds, if properly and economically used, would be much cheaper than the kind the farmers too often buy, because the price is more nearly what they think they ought to pay.

I recall an instance illustrating this point nicely. It happened some years ago in Colorado, where the farmers on "dry" farms or on irrigated farms having water rights of late date have to nurse the resources of their land quite as carefully as any of the farmers on rocky New England farms. I was breeding a line of very large Buff Leghorns, and sometimes for late hatches I crossed the males on Buff Cochin and Brahma hens. The produce of this cross was not unlike the Rhode Island Red, and proved very attractive to farmers who saw it. Early one spring a farmer whom I knew very well came to me to buy a cockerel. After seeing some of these cross-bred hens and learning how they were bred, he said he had some hens that looked a good deal like Buff Cochins,

— perhaps twelve or fifteen of them in a flock of sixty or seventy hens; and he thought he would take a Buff Leghorn cockerel and mate with them, separating them from the rest of the stock. But the only bird of that variety I happened to have that I could sell was one I had been keeping for a reserve bird, — a big, well-built fellow, too good in color to use merely in cross-breeding; and I held him at a figure I thought no ranchman would pay. So I tried to sell him a Brown Leghorn, of which I had on hand a few birds at prices that would suit him better, though none of them had the size and shape of the Buff one. Finally, when he insisted on my giving him a price on that bird, I told him he could have it for four dollars. He went away without buying a bird. A few days after he came again, wanted to know if the bird had been sold, and, learning that he had not, said, "Well, if you'll take it in hay, I'll take him." I agreed to that, and he took the cockerel away with him, having first exacted a promise that I would not tell "the old woman" the price of the bird.

Next fall he came to me one day to tell me how well he had done on that investment. Hatching only from that one male, mated with a few of his best hens, he had had the evenest and quickest growing lot of chicks, that had ever been on the farm. The cockerels hatched at the usual season had been ready for market before prices went down; the pullets well grown, and beginning to lay before winter; and, taking it all in all, he estimated that they were something like fifty dollars better off than if he had bought a small, cheap rooster. "But," he said, as he concluded his story, "I haven't told my old woman yet what I paid you for that rooster."

I don't want to be understood as in any way implying that the fancy poultry breeders' scale of prices is adjusted to the values of his birds to farmers, or for practical breeding purposes. The position I take is, that in buying stock to improve his flock the farmer should not take birds that have not in marked degree the qualities he desires to introduce into his flock. If he can get at a low price birds that are culls for some superficial defect, not affecting their real value, so much the better; but if he cannot get the qualities he wants in a low-priced bird, it is much cheaper in the end to buy a higher-priced one; and the point I especially want to bring out here is that in a great many cases the superfluous males on a farm, sold at market prices, would bring the price of a really good thoroughbred bird.

Or, if one has one or more male birds — as many as he needs — that are as good as he needs, what is saved by disposing of unnecessary male birds will go a long way toward the expense of provid-

ing special quarters for the breeding stock. It is this item of expense, I think, which deters a great many from separating their breeding stock, even after they are ready to admit that that is what ought to be done. This expense, however, need not be considerable, and the special quarters for breeding stock will certainly pay for themselves several times over in the first season they are used, if other things are as they should be.

There are other applications of the principle of selection which may profitably be employed by the farm poultry keeper. The influence of natural selection is by no means limited to the phenomena of reproduction. Indeed, if the theory of natural selection supposed the operation of the principle more energetic at one stage of life than at another, that was the growing stage, and particularly the earlier part of it. The phrase "survival of the fittest" inevitably suggests the destruction of the unfit. Yet this is the point where nearly all poultry growers, whether farmers or fanciers, seem to come to a standstill. There are few who will not admit that it is better for the brood and flock, more profitable for the keeper, and kinder to the chick itself, to kill the weakly chicks as soon after hatching as their weakness is discovered; and to follow this by taking away from the flock every chick that fails to grow properly, and so lags behind the rest in development. But it is a very rare thing to find a poultry keeper who will do this. The usual practice is to let everything live until it is marketable, — or dies from natural causes.

And it is just this that is responsible for more than half of the troubles people have in growing chickens. It is on the weak and puny chick, that has not life and strength enough to dust itself, that lice increase, until they become numerous enough to worry the strong chicks. It is the weak chick that develops distempers and diarrhœas, and poisons the air for the others with its fetid breath, and makes the coop or brooder foul with its slimy discharges. It is after the weak chicks that one must be constantly cleaning up; their presence in a flock is always adding to the poultry keeper's burden. I never could understand why people should be so reluctant to kill a fowl or animal which they knew was not fit to live, and probably would not live to meet the use for which it had been produced.

When we plant seed, we plant enough to allow for the failure of a great many seeds to grow, and still give a great many more plants than can be properly grown on the allotted ground. Then, as the plants grow, they are thinned out, all the weak and unthrifty ones being uprooted like weeds, and no more of the thrifty spared than can make good growth. The same thing should be

done with the chickens. No unthrifty ones should be allowed on the premises, and the thrifty and vigorous should not be overcrowded. If they are, they do not long remain vigorous and thrifty.

Besides being a constant menace to the welfare of the flock and a burden to the caretaker, the weakly and runty chickens are rather costly property. It takes a great deal more food to make meat on them than on strong and thrifty chickens. No scientific experiment is needed to demonstrate this. Any one who has weakly chickens in his flock can demonstrate the matter for himself by separating them, by taking an equal number of healthy chicks of the same age, and noting how the two lots eat and how they grow. The weakly lot will eat nearly if not quite as much as the others, and hardly grow at all; while the others are gaining perhaps over an ounce a day. When finally the weak ones that live have attained marketable size, they will in most cases have cost more than they will bring, and they never make good poultry. The loss on them is least when they are cleared out as early as possible. Not one time in ten is anything gained by keeping them, in the expectation of finally realizing a little something on them. It is safe to say that this class of losses cuts the profits of nearly all poultry keepers far more severely than they realize.

The matter of overcrowding has been mentioned. It is a thing to be avoided as one would avoid a contagious disease. People do not comprehend how injurious overcrowding is, unless they have opportunity to compare results when two similar lots of chickens are kept, one in crowded quarters, the other with abundant room; and this opportunity for comparison seldom comes except to those who intentionally make it.

"Farm range" for growing chicks ought to mean a great deal. Too often it means very little, — means only that the chicks are on a farm, and are not confined. The "range" is so overstocked that they get next to nothing of what they are supposed to get on a range, — green food and insect food; and, these not being supplied to them (because, being on "free range," (?) they can procure them by foraging), they are in effect worse off than yarded fowls, to which these things are supplied. If one desires to use free-range methods, he must take care not to overstock his range. If he desires to keep more fowls than can be suitably kept on his place by such methods, he must to some extent adopt the methods of intensive poultry culture.

Overcrowding, overstocking premises with poultry is a fault common to all classes of poultry keepers. It is only here and

there that you find one avoiding it entirely. Fanciers are most likely, while giving fowls sufficient house room, to limit them too much in the matter of yard room; while with farmers it is apt to be the other way. Between the two evils there is nothing to choose, and no choice should be made. There should be sufficient indoor room, and that in a suitable building or coop for both fowls and chicks, and a generous allowance of room outdoors. While it is unquestionably better for fowls not given enough room outdoors to have a roomy house than to be crowded indoors as they are out, and better for fowls given coops only big enough to roost in that they have a good range during the day, the best results cannot be obtained by subjecting fowls to unfavorable conditions half the time; and it makes little difference whether that half is day or night.

For best results there must be uniformly good conditions. "Whatever is worth doing is worth doing well." If it is worth while to utilize the farm land for poultry, it is worth while to properly house what fowls are kept. If the expense of putting up buildings for what fowls can be kept on the land is too great at first, the proper balance of conditions can be maintained by reducing the numbers kept to what can be properly housed. The common experience of poultry men who make a specialty of poultry is that the flock so limited in numbers not only pays a better profit per head, but also a greater total profit than when the premises are overstocked. Market reports this season have furnished an illustration of this point on a very large scale. After prices of grains went up last fall, buyers of poultry throughout the country reported that the stocks on the farms were being very much reduced, and it was predicted that on this account there would be a shortage of eggs and poultry this season. There was a shortage of eggs early in the winter, because even fewer flocks than usual were producing; but after the hens began laying the production was greater than last year. It is altogether probable that this is because the reductions of the farm flocks made the conditions so much better for the fowls that remained that their average production was very much increased.

In conclusion, let me urge on farmers who want to make their poultry as profitable as possible, a point which, when first stated, may not seem to fit the subject of this article. It is this: never stint your growing chicks on feed. Let them have all they can eat and digest properly. Don't starve them to make them hunt for food. If possible, spread them out over the farm so that they can get what grass they need, and some insects, without running

about much; then either feed them often, or keep food standing before them.

The farm-grown chick ought to make the very best of poultry; but the ordinary farm-raised chick does not. Nearly all of those who grow poultry on farms think their poultry is as fine as fine can be; but the common farm chicken does not compare in quality with the finest poultry in our markets, because it is not so well fed and quick-grown, and runs about so much that it early becomes quite hard-meated. Rapidity of growth means as much in the quality of a fowl as it does in the quality of a vegetable like the beet; and to make quick growth there *must* be food in abundance, and *must not* be too much exercise. Exercise is a good thing. Enough of it to keep the system in good condition is necessary; more is too much of a good thing.

To attempt to economize on cost of growing chicks by keeping them on just about a maintenance ration is not good policy. The quicker you can get the cockerels ready for market the more you will save in labor, — and in feed too, — and the better will be your returns when you sell them. The earlier you can bring the pullets to a well-developed maturity, the better will be your prospects of eggs when eggs are highest.

Don't keep either moulting hens or growing chicks on short rations, because they are not adding anything to the current income. Feed to bring them into earning condition as soon as possible, and to secure the best possible development of their qualities. If you happen to have more stock on hand than you can feed, while it is not earning, as it should be fed, cut it down to what you can carry, and you will be better off in the long run. It is a great deal better to have a small flock earning something, be it ever so little, in the early winter, than to have a large flock that was only half fed through the fall running one behind until it takes the most of the next season to catch up. To feed to satisfy all the requirements of the fowl is in the end the most inexpensive way.

SERIES OF 1902. BULLETIN NO. 5.

MASSACHUSETTS

CROP REPORT

FOR THE

MONTH OF SEPTEMBER, 1902.

ISSUED BY

J. W. STOCKWELL,

SECRETARY STATE BOARD OF AGRICULTURE.

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Crop Report for the Month of September, 1902.

Office of State Board of Agriculture,
Boston, Mass., Oct. 1, 1902.

Bulletin No. 5, Crop Report for the month of September, is herewith presented. Attention is called to the article at the close of the bulletin on "Improvement of Pastures," by Prof. J. W. Sanborn, formerly director of the Missouri Agricultural Experiment Station, president of the Utah Agricultural College and director of the Utah Agricultural Experiment Station. Professor Sanborn is now engaged in extensive farming operations at Gilmanton, N. H. This article is in a sense supplementary to his article in the July bulletin on "Beef Production in New England," in which he laid down the necessity of improved pastures as one of the essentials to success in beef production on our farms but is also of particular interest to dairy farmers.

Progress of the Season.

The September returns of the Statistician of the United States Department of Agriculture (Crop Reporter for September, 1902) shows the average condition of corn on September 1 to have been 84.3, as compared with 86.5 on August, 1, 51.7 on Sept. 1, 1901, 80.6 at the corresponding date in 1900, and a ten-year average of 78.8. The crop, however, is so late that throughout the entire northern portion of the belt predictions of more than an average crop are invariably made contingent upon the immediate advent and continuance for some days of the most favorable conditions of weather.

The average condition at harvest of winter wheat and spring wheat combined was 80, against 82.8 last year, 69.6 in 1900, and a ten-year average of 78.9.

The average condition of oats when harvested was 87.2, against 72.1 last year, 82.9 in 1900, and a ten-year average of 79.7. While correspondents report the harvesting of an exceptionally large crop of oats, there are indications that the crop will be very deficient in quality.

The average condition of barley when harvested was 89.7, against 83.8 last year, 70.7 in 1900, and 82, the mean of the averages of the last ten years.

The condition at harvest of winter and spring rye combined was 90.2, against 84.9 last year, 84.2 in 1900, and 84.5, the mean of the averages of the last ten years. The present conditions are above the ten-year average in all of the principal rye-producing States except New York.

The average condition of buckwheat on September 1 was 86.4, against 91.4 on Aug. 1, 1902, 90.9 one year ago, 80.5 on Sept. 1, 1900, and 84.7, the mean of the September averages of the last ten years.

During August there was a decline in the condition of tobacco amounting to 1 point in North Carolina, Ohio and Pennsylvania, 2 in Kentucky, 6 in New York and 7 in Maryland. On the other hand, South Carolina showed an improvement of 1 point, Wisconsin 2, Connecticut 2 and Virginia 7.

The average condition of potatoes on September 1 was 89.1, against 94.8 on August 1, 52.2 on Sept. 1, 1901, 80.0 at the corresponding date in 1900, and 74.6, the mean of the September averages of the last ten years. Every important State except New York shows a condition considerably higher than the ten-year average.

There was a decline in the condition of sweet potatoes during August in six of the principal producing States, but five of the principal States still show an average equal to or above that of the previous month. In all the principal producing States, except New Jersey, Virginia and South Carolina, present conditions are from 3 to 33 points below their ten-year averages.

The acreage of clover seed has been considerably reduced since last year, only two of the principal producing States reporting even a small increase.

Of the eight principal sugar-cane producing States, Florida, Texas and Arkansas report improvement in condition during August, while Louisiana, South Carolina, Mississippi, Georgia and Alabama show declines. All but two of these States show conditions below their ten-year averages.

An improvement in the condition of rice during August is reported in but one of the rice-growing States. In Louisiana, the chief State of the rice-growing industry, the condition is 20 points below the mean of the averages of the last ten years.

Of the States having four million trees and upwards in apples, eleven report an improvement in condition during August. All but six of the important apple-growing States report conditions ranging from 7 to 32 points above their ten-year averages.

Reports as to the production of peaches as compared with a full crop show eight of the principal States with conditions above those of Sept. 1, 1901. In all but eight of the States having 2,000,000 trees or upwards in 1899 a production exceeding the ten-year average is probable.

In all of the States in which the production of grapes is of more than local importance, except New York, Iowa and Kentucky, the present condition is above that of Sept. 1, 1901, and the condition in all but five of the principal grape-growing States is equal to or above the ten-year average.

There is a decrease in the number of stock hogs now being fattened as compared with the number a year ago in every important State except Pennsylvania. Reports as to size and weight of stock hogs indicate a condition above the ten-year average in but four of the principal States, — Illinois, Missouri, Tennessee and Pennsylvania.

The average condition of cotton on August 26 was 64, as compared with 81.9 on July 25, 71.4 on Aug. 24, 1901, 68.2 on Sept. 1, 1900, and a ten-year average of 73.7. The present unprecedentedly low average of condition, which is two-tenths of a point lower than the condition of Sept. 1, 1896, is due mainly to the reports from Texas and Alabama, in both of which States the prevailing conditions are nothing less than disastrous.

In Massachusetts the average condition of corn September 1 was given as 76; the average condition of rye when harvested as 90; the average condition of oats when harvested as 96; the average condition of buckwheat September 1 as 96; the average condition of potatoes as 95; the average condition of apples as 83; the average condition of peaches as 83; the average condition of grapes as 92; the average condition of tobacco as 99; the acreage of clover seed as compared with last year as 80, and its average condition as 70; the number of stock hogs fattening as compared with last year as 97, and their condition as 98.

TEMPERATURE AND RAINFALL FOR THE WHOLE COUNTRY.

[FROM THE UNITED STATES CLIMATE AND CROP BULLETINS.]

Week ending September 1. — The week averaged somewhat cooler than usual in the South Atlantic and east Gulf coast districts, in the Missouri valley and generally throughout the western Plateau and Pacific coast regions. The week was warmer than usual in the central and west Gulf States, over the south-eastern Rocky Mountain slope, and from the upper Mississippi valley eastward to the New England and middle Atlantic coasts, being excessively warm in Texas and Oklahoma. It was the third consecutive week with practically no rain over the greater part of Texas, while no appreciable amount fell over a large part of the middle and south Atlantic coast districts and over portions of the Ohio valley and Lake regions. Only light showers occurred in northern New England and much of the upper Mississippi valley, but over portions of the central and east Gulf districts, and in the lower Missouri and Red River of the North valleys, the rainfall was very heavy, portions of the lower Missouri valley and central Gulf States receiving from 2 to more than 4 inches.

Week ending September 8. — The week was warmer than usual in the Pacific coast and Plateau regions, over the middle Rocky Mountain slope and along the Gulf and middle Atlantic coasts. In the central valleys, Lake region and over the interior portions of New England, Middle Atlantic and southern States, the week averaged cooler than

usual, being decidedly cool in the lower Missouri and upper Mississippi valleys, where the temperature deficiency ranged from 3° to 6°. Freezing temperatures occurred in northern Montana, western North Dakota and in northern New England. Heavy rains fell over the greater part of the central and west Gulf States, and more than the average amount in portions of the upper Lake region and portions of New England and the Middle Atlantic States. In the lower Lake region, Ohio valley, Tennessee, central Mississippi valley, over portions of the Middle and South Atlantic States and generally throughout the Missouri valley the rainfall was below the average, no appreciable amount falling over a large part of the Ohio and upper Missouri valleys.

Week ending September 15. — The week was decidedly cool in the districts east of the Rocky Mountains, although the temperature was normal or slightly in excess over a limited area on the east coast of southern Florida and on the southern New England coast. Over the Plateau regions and the Pacific coast States, except the northern California coast, the week averaged warmer than usual, being unseasonably warm over the western portions of the Plateau regions and the interior of the Pacific coast districts. There was more than the usual rainfall in the coast districts from Florida to New England, from the Ohio River northward to the Great Lakes and in portions of northern Louisiana, Arkansas and western Mississippi. There was less than the usual rainfall in the Missouri and upper Mississippi valleys, over the northern portion of the Lake region, the interior part of the central Middle Atlantic States and over the greater part of the central and west Gulf districts. Practically no rain fell in Texas and there was a general absence of rain throughout the Rocky Mountain and Pacific coast districts.

Week ending September 22. — The week averaged warmer than usual in the lower Lake region, portions of the upper Lake region and northern New England, along the central and west Gulf coasts, over the south-eastern Rocky Mountain slope, and on the immediate coast of northern California. The week averaged decidedly cool in the South Atlantic

States, the Missouri valley, and over northern Rocky Mountain and north Pacific coast districts. Nearly normal conditions prevailed in the Ohio and upper Mississippi valleys. The rainfall of the week was less than average in the Lake region, Ohio valley, east Gulf States and generally throughout the Atlantic coast districts. Portions of the west Gulf States and upper Mississippi valley also received less than the average rainfall, but generally throughout the eastern Rocky Mountain slope, the central Mississippi valley and portions of the Missouri valley the rainfall was in excess of the average. Oklahoma, southern Missouri, south-eastern Kansas, central Illinois and an area extending from south-eastern Colorado to southern Minnesota received very heavy rainfall.

Special Telegraphic Reports.

[Weather Bureau, Boston.]

Week ending September 1. — New England. Boston: Weather favorable; corn improving, partial crop in south, failure in north; excellent crop of rowen; fall pasturage good; apples good, except winter varieties; cranberries and peaches good; early potatoes good, late potatoes somewhat injured by rot and blight; tobacco excellent, cutting begun.

Week ending September 8. — New England. Boston: Weather favorable; frost general in the interior on the 6th, some damage to corn and truck; potatoes rotting badly; good crop fall apples, winter small; corn practically a failure except for fodder; tobacco being cut and cured, good crop of extra quality.

Week ending September 15. — New England. Boston: Weather generally favorable; copious rains very beneficial in southern portion; frosts in some sections, but no great damage; potatoes continue to rot badly; other vegetables good; vine crops below average; wind damaged apples considerably; peaches fair; cranberries nearly all harvested, good crop; tobacco good crop and in excellent condition.

Week ending September 22. — New England. Boston: Weather generally cloudy and damp; unfavorable for harvesting crops and curing tobacco; grain harvest completed with satisfactory results, except corn is a failure and but little has been canned; potatoes continue to rot and yield

will be less than earlier estimate; shortage in winter apples, some blown off and dropping continues; late vegetables good; tobacco excellent; cranberries an average crop.

The Weather of September, 1902.

The month opened with warm, sunny weather. The temperature ranged from five to ten degrees above normal for the first four days, rising to the 90s in many sections on the first and second days. General rains followed on the 4th and decidedly lower temperature by the 6th, when frosts occurred in many sections of the State. The cool weather was of short duration, the temperature climbing to the 80s during the 8th and 9th, when it ranged several degrees above the seasonal average. The high temperature was, however, of short duration, the mercury falling to the 50s on the 10th. The remainder of the month was slightly cooler than the average, except from the 21st to the 23d, when there was a slight excess in the temperature. While the weather of the month was characterized by much cloudiness, and light rains fell on many days, the rainfall was deficient, the amount being about half of the normal fall for September. A conspicuous feature in connection with the weather was the absence of general or severe storms and extended "north-easters," which are usually experienced at this season of the year. The frosts that occurred during the month were generally light, and, except in favorable localities, not sufficiently heavy to stop vegetable growth or kill vegetation, except of the very tender varieties. Taken as a whole, the weather of the month was very favorable to harvesting and securing crops, to fall seeding and to farm operations in general.

In the circular to correspondents returnable to us September 23 the following questions were asked: —

1. How does the crop of Indian corn compare with an average crop?

2. Are the rowen crop and fall feed up to the usual average?

3. Has the usual amount of fall seeding been done, and what is its present condition?

4. How does the onion crop compare with a normal crop?

5. How do potatoes compare with the normal in yield and quality?

6. What is the prospect for root crops, celery and other late market-garden crops?

7. How have the apple, pear, peach, grape and cranberry crops turned out?

Returns were received from 149 correspondents, from which the following summary has been made: —

Indian Corn.

On the whole, Indian corn is one of the poorest crops ever secured. The frosts of the first week in September severely injured the crop on high land in some sections, practically none of the crop being ripened at that time, and even with the absence of frost from that time to the time of making returns much still remains to mature. That which has ripened is not well eared, and in almost all cases less than an average crop will be secured. The stover is fairly well developed, and should be of good nutritive value where not injured by frost.

Rowen and Fall Feed.

Owing to the late cutting of the first crop of hay and the cool weather of September rowen is somewhat below the average crop. The dull weather of the past month has been very unfavorable for securing the crop and much of it still remains in the field. Fall feed is in excellent condition, and in most sections pastures and mowings will start next season in good condition.

Fall Seeding.

The lateness of haying put all farm work back so much that less than the usual amount of fall seeding has been done for the State as a whole. The dull weather also had a tendency to delay work in this line. Such seeding as was put in early generally made a good catch, and is now in good condition and growing well.

Onions.

Onions are rather less than an average crop in most sections, although there are numerous local exceptions. Like all crops this season requiring a long period of summer weather to reach maturity onions are not yet ripened in many cases, and still need some warm weather for best results. Thick necks appear to be somewhat prevalent, but practically no blight is reported. Prices are very satisfactory so far as reported on.

Potatoes.

The yield of potatoes was somewhat shortened by rot, but not as much as was feared a month ago. The quality of the crop was generally excellent where unaffected by rot.

Root Crops, Celery, etc.

Root crops are generally reported as in excellent condition and promising well. Celery is also a good crop as far as reported on. Other late market-garden crops are generally fair, but not extra good, as the cool weather has operated to hold them in check.

Fruits.

Apples improved in condition during the month and a good crop will be secured, winter varieties, however, not giving as good results as fall varieties. The fruit is unusually fair and of good quality. Pears are, as previously indicated, a very light crop. Peaches are uneven, but the crop as a whole was above the average in yield. There was some complaint as to the quality and flavor of the fruit. Grapes are a heavy crop, but did not ripen well in many cases and are still liable to injury from frost. Cranberries are a light crop in the sections of commercial production, although some bogs will yield very well indeed.

NOTES OF CORRESPONDENTS.

(Returned to us September 23.)

BERKSHIRE COUNTY.

Otis (S. H. Norton). — Indian corn was a complete failure. Rowen and fall feed are above the average in condition. No onions are raised in this section. Potatoes are below the average in yield and quality. Apples are about an average crop; very few pears.

Monterey (Wm. S. Bidwell). — Indian corn is not more than half a crop. There is not much rowen, but fall feed is in good condition. No onions raised. Potatoes are a full crop in yield and quality. The prospect is good for root crops, celery and other late market-garden crops. Apples and pears are good crops.

Tyringham (E. H. Slater). — Corn did not ripen much in this locality. Rowen and fall feed are up to the average in condition. Not much fall seeding has been done as yet. Only a few onions are raised in this town. Potatoes are a normal crop in yield and quality. The apple crop is very good; pears not as good as usual; very few peaches raised; grapes very good; no cranberries grown in this vicinity.

West Stockbridge (J. S. Moore). — The corn crop is the poorest in years; cold, wet weather has made it almost a total failure and frost spoiled fodder in many sections of the town. Rowen and fall feed are not up to the usual average, cold weather having affected them. Some farmers have good crops of potatoes, but others are very poor and rotting somewhat. The prospect for root crops, celery and other late market-garden crops is fair if we should have a period of warmer weather. Apples and pears are fair crops; other fruits not raised.

Richmond (T. B. Salmon). — Indian corn is a very poor crop. Rowen and fall feed are up to the usual average. The usual amount of fall seeding has been done and it is in good condition. Onions are little raised. Potatoes are below an average crop in both quality and quantity. Root crops, celery and other late market-garden crops promise to be about average. Early apples good; pears good; no peaches, grapes or cranberries.

Washington (E. H. Eames). — The corn crop has been cut by frost, except now and then a field that escaped, and will not be

more than one-fourth of an average crop. Rowen and fall feed are up to the usual average. The usual amount of fall seeding has been done and at present it is in good condition. Onions are not raised. Early potatoes are a good crop, but late ones are not over half a crop. Root crops, celery and late market-garden crops are not raised in this locality. Apples and pears are an average crop; other fruits not raised.

Hancock (C. H. Wells). — There is very little corn that will ripen. Rowen and fall feed are up to the usual average. The usual amount of fall seeding has been done and it is in good condition. Onions are not raised. Potatoes are not more than a third of a full crop, but are of good quality. Not many root crops, celery and other late market-garden crops raised. Apples will be an average crop; other fruit scarce.

Lanesborough (Scott Jenks). — Indian corn is 80 per cent of an average crop. Rowen and fall feed are up to the usual average. The usual amount of fall seeding has been done and it is in good condition. Potatoes have rotted badly. Apples, pears, peaches and grapes are good crops. Early frost has injured corn, rowen, etc.

Cheshire (L. J. Northup). — Indian corn will not be more than three-fourths of a crop. Rowen on early cut fields will be good, fall feed in the same ratio. Fall seeding has not been equal to former years in amount done, and it is too early to form an opinion of its condition. Potatoes have rotted, making the yield much less than average; quality good. Root crops are looking well; cabbages are a splendid crop; turnips growing finely. Apples are quite plentiful; pears a little off.

Florida (E. D. Rice). — Corn is very backward, but is doing well now. Rowen and fall feed are up to the usual average. About the usual amount of fall seeding has been done and it is in good condition. Onions are not much raised and are a light crop. Some fields of potatoes are rotting badly and some give a normal crop. Not much celery is raised; turnips are raised for market and are looking well. Apples are looking well.

FRANKLIN COUNTY.

Rowe (J. F. Brown). — Indian corn is not over 5 per cent of an average crop and we have no sound corn. Fall feed is in average condition; rowen not quite up to the average because the first crop was late cut. Less than the usual amount of fall seeding has been done, but what is in is looking well. Potatoes are about an average crop as to yield and quality. Apples and pears have turned out well.

Colrain (A. A. Smith). — Corn is very much less than an average crop. Rowen and fall feed are up to the usual average. The usual amount of fall seeding has been done and it is in good condition. Onions are a normal crop. Potatoes are much below the normal in yield and quality. Root crops, celery and other late market-garden crops are up to the average. Fruit of all kinds is good.

Shelburne (Geo. E. Taylor). — Corn is maturing fast and a week of warm weather will secure a good yield of sound corn; some fields badly injured by grubs. Rowen is not a full crop, but pastures are in good condition. The usual amount of fall seeding has been done and it looks exceedingly well. Potatoes are below the normal in yield, but of good quality. Apples are a very fine crop; pears, peaches and grapes short.

Gill (F. F. Stoughton). — Indian corn is less than an average crop. Rowen and fall feed are above the usual average. Potatoes have made a good yield, but have rotted badly. There is a good crop of apples; grapes do not ripen.

Deerfield (Chas. Jones). — Indian corn is two weeks late and has come forward slowly in the recent cool weather. Rowen is a fair crop where the first crop was taken off early, but is a light crop as a whole. About the usual amount of fall seeding has been done and it is looking well. Onions are a small crop, but are curling fairly well. Potatoes are a fair crop, but show some blight and rot. The prospect is good for root crops, celery and other late market-garden crops. Apples are a fair crop; pears, peaches and grapes small crops. Tobacco is all on the poles and is a very fine crop.

Sunderland (J. M. J. Lagate). — Corn is far below the average, not half a crop. Rowen and fall feed are above the average, rowen especially. There has been the usual amount of seeding done and it is looking well. There is a large onion acreage, but a considerable proportion of the acres planted will amount to little; probably there will not be over half a crop as a whole. Root crops, celery and other late market-garden crops are but little raised, but what there are look well. Apples are fully up to the average; what few pears, peaches and grapes there are are a little above the average. Tobacco is the best crop in this vicinity, as it went into the barns a perfect leaf and is curing a fine, silky, light-colored leaf. It is the most perfect crop I ever saw and should bring a fancy price.

Wendell (N. D. Plumb). — Indian corn is very backward and we will not harvest over half a crop. There is but little rowen, but fall feed is good. But very little seeding has been done. Potatoes are a large yield of good quality. Root crops, celery

and late market-garden crops are but little raised. Apples promise the largest yield for years; peaches are plenty and very cheap; no pears, grapes and cranberries to speak of.

Orange (A. C. White). — The cold, wet season, with the frost the first of the month, ruined the corn crop. Rowen and fall feed are up to the usual average. Onions are a normal crop. Potatoes have yielded well but have rotted badly, taking half the crop on some fields and some on all. Apples are abundant and other fruits fair crops.

New Salem (Daniel Ballard). — Indian corn will be about a two-thirds crop. Rowen and fall feed are up to the usual average where the first crop was cut in season. A small amount of fall seeding has been done, and is in good condition. Potatoes are about an average crop, but many have rotted in the ground. The prospect for root crops, celery and other late market-garden crops is good. There is an abundant crop of apples; few pears and peaches; grapes plenty.

HAMPSHIRE COUNTY.

Greenwich (Wm. S. Douglas). — Indian corn will be a fair crop. Rowen and fall feed are not up to the usual average. Less than the usual amount of fall seeding has been done and it is not in the best condition. Potatoes are a good crop in yield and quality. The prospect is good for apples, pears, peaches, grapes and cranberries.

Enfield (D. O. Chickering). — Corn is not up to the average and is very late in maturing. Some fields of rowen are good, but as a rule it is not up to the average. But few onions are raised, but these have done well. Potatoes are about an average crop, but some fields have rotted badly. Root crops, celery and other late market-garden crops are good so far as raised; tomatoes do not ripen well. Apples are somewhat variable, but will average a good crop; pears rather a small crop; peaches the heaviest crop in years; grapes below the average.

Belchertown (H. C. West). — Corn is a fair crop but is two weeks late. Rowen is light, not more than half a normal crop. There is a good crop of late potatoes, in places extra good, with little or no rot or blight. Apples are above the average both in quantity and quality; peaches, pears and grapes a full average. Pastures are short, as they have been throughout the season.

Hadley (L. W. West). — Indian corn is below the average in condition, but if frost holds off will mature this month, except late planted on cold, wet land. Rowen and fall feed are in fine con-

dition. The usual amount of seeding has been done and it never looked better. Potatoes are an average crop, after allowing for rot, which is quite serious in some places. Winter squashes are nearly a failure, but other late garden crops and root crops are average. Apples, pears and grapes are abundant in most sections. Tobacco was all harvested in good condition, is remarkably free from injury by insects and hail and is curing in fine condition.

Northampton (H. C. Comins). — Indian corn is a full average crop but is late. There is an excellent rowen crop and fall feed is above the usual average. Onions are about 80 per cent of a full crop. Potatoes are an excellent crop, but rot is very prevalent. Root crops are looking finely, with a luxuriant growth, but some of them are decaying because of too much moisture. There are very good crops of all kinds of fruit. Tobacco is of excellent growth and is curing in fine shape, and bids fair to be one of the best crops in years.

Westhampton (H. A. Parsons). — Indian corn is from one-half to three-fourths of a full crop. Rowen and fall feed are up to the usual average. The usual amount of fall seeding has been done and is in good condition. Potatoes are from one-third to one-half of a normal crop, having been cut short by rot. Root crops, celery and late market-garden crops are not much raised. Apples are a good crop.

Chesterfield (H. C. Bisbee). — The corn crop is the poorest ever known in this vicinity and but little will ripen. Feed is good in pastures but rowen is hardly up to the standard, partly because of the late cutting of the first crop and because of cold weather. Potatoes are a good crop and have turned out well. There is some complaint of rot, but it is not bad. Apples are of fine quality and there will be a good many to send to market.

Goshen (Alvan Barrus). — There is not half a crop of corn either for grain or ensilage. Fall feed is good; rowen promised well at first but has fallen below the average. Onions are little raised. Potatoes are a much better crop than last year. Apples, pears and peaches in profusion; grapes are abundant, but will hardly ripen; cranberries below par. Beans will not be half a crop.

Cummington (S. W. Clark). — Very little Indian corn will ripen and it will be a light crop, one-fourth crop or less. Rowen is good except where the first crop was cut too late. The usual amount of fall seeding has been done and it looks finely. Some fields of potatoes are very good, while others have lost half the crop by rot. Root crops, celery and other late market-garden crops are quite good. Apples are a fair crop; pears large and fine; peaches and grapes normal.

HAMPDEN COUNTY.

Blandford (E. W. Boise). — Corn is almost a total failure as to grain and not over a three-fourths crop as to forage. Rowen and fall feed are much above the average in condition. Potatoes are 75 per cent of a normal crop in yield and of extra good quality. The prospect for root crops, celery and other late market-garden crops is only medium. Apples are an extra full crop; other fruits only medium. Ripe strawberries have been picked during the past week and blossoms are now to be seen, and in a section of the town, where frosts the first of the month were sufficient to kill all garden truck and corn, two sprays of apple blossoms have been picked.

Granville (Joseph Welch). — Indian corn is away below an average crop. The rowen crop is very heavy, and pastures are looking very well. Potatoes are a very good crop in yield and quality, but have rotted somewhat. Root crops, celery and other late market-garden crops are not raised for market. Apples, pears, peaches and grapes have turned out finely. Apples are large and fine and free from worm holes, and bring about $1 per barrel in the pile and from $1.25 to $1.75 barrelled at the station.

Russell (E. D. Parks). — Indian corn is above the average in acreage, but is slow in maturing, although it may be that the yield will be a little above the average. The usual amount of fall seeding has been done and is in very good condition. Rowen and fall feed are up to the usual average. Onions are an average crop. Potatoes are above the normal in yield, but are rotting badly on some fields. The prospect is good for celery, root crops and late market-garden crops. All fruits have yielded very well.

West Springfield (N. T. Smith). — Taken in all respects corn is about 60 per cent of an average crop. Rowen and fall feed are above the usual average where the first crop was cut early. Less than the usual amount of fall seeding has been done on account of the weather and backwardness of the season, but what has been done is in A1 condition. Onions are below the average, although some few fields are exceptionally good; some blight. Average yield of large potatoes, some rot; quality above the average. Late market-garden crops, even squashes, are good in this section. Apples are about 70 per cent of a full crop.

Chicopee (R. W. Bemis). — Indian corn is a good average crop. Rowen and fall feed are above the usual average. Root crops, celery and other late market-garden crops are in good condition. Apples, pears, peaches and grapes have turned out well.

Longmeadow (W. F. Emerson). — Corn will not give over half

a crop of grain; some fields as good as usual, others late and do not ear out well. Rowen and fall feed are up to the usual average. Less than the usual amount of fall seeding has been done. Many potatoes were planted, but they are not a great crop and some are rotting. Celery is not looking well, and like other crops needs sun and heat. Apples and pears are better than average crops; peaches average; more grapes than for a number of years.

Hampden (J. N. Isham). — Indian corn is backward in ripening and is considerably below an average crop. Fall feed good; rowen good, but many late-cut mowings had not time to grow a crop. Customary amount of fall seeding done, somewhat late but doing well. Onions are about three-fourths of a full crop. Potatoes are a larger yield than usual of very good quality. Root crops are mostly promising, as are other market-garden crops. Apples and peaches turned out extra well; pears, grapes, etc., fair.

Wilbraham (H. M. Bliss). — Indian corn is about a three-fourths crop. Rowen and fall feed are 20 per cent below the average. Less than the usual amount of fall seeding has been done. Onions are a fair average crop. Potatoes are a three-fourths crop of good quality. Apples, 70; pears, 85; peaches and grapes, 100; cranberries, 65. Frosts have done but little damage.

Palmer (O. P. Allen). — Indian corn is not up to an average crop. Rowen and fall feed are up to the usual average. The usual amount of fall seeding has been done and is in good condition. Onions are a good crop. Potatoes are about an average crop in yield and quality. The prospect is quite good for root crops, celery and other late market-garden crops. Apples, pears, peaches and grapes have turned out better than was expected.

Wales (G. S. Rogers). — Corn is a very light crop. Rowen and fall feed are heavy. The usual amount of fall seeding has been done. Onions are only raised for home use and are a fair crop. Potatoes are good in yield and quality, but some fields are rotting badly. Root crops, celery and other late market-garden crops are not grown to any extent, but what there are are in good condition. Apples are a fair crop; peaches not raised; pears light.

WORCESTER COUNTY.

Warren (W. E. Patrick). — The corn crop must be below the average, but with warm weather it would much improve. Rowen is a short crop, but fall feed is up to the average. Less fall seeding has been done than usual and the condition is fair. Potatoes

are considerably above the normal in yield, with quality excellent, but much complaint of rot. There is a large yield of apples of extra good quality; an average crop of pears; peaches and grapes above the average.

Brookfield (F. E. Prouty). — Indian corn is about an average crop, but is two weeks late. Rowen and fall feed are up to the usual average. About the usual amount of fall seeding has been done and looks well. Potatoes are a good crop, but show some rot. The prospect is good for root crops, celery and other late market-garden crops. Apples are a large crop, pears about half a crop; what few peach trees we have are full of fruit; grapes are a large crop, but late.

Spencer (H. H. Kingsbury). — The corn crop is from one-quarter to one-half less than an average crop. The crop of rowen is very heavy, with much clover. Favorable weather has made a good growth of fall feed. There is about the usual yield of potatoes of excellent quality; some fields are rotting badly. Late root crops, such as turnips, cabbage and celery, are in fine condition and growing well. Fruit of all kinds is abundant, but cranberries were nearly all ruined by the frost of September 5.

North Brookfield (J. H. Lane). — Indian corn is not yet ripe, and the frost of the first week in September ruined much of it. Rowen is not a full crop as the first crop was cut too late. Fall feed is in good condition. Potatoes are above the average in yield and of excellent quality. The prospect is good for root crops, celery and other late market-garden crops. Apples half a crop; pears, 10 per cent; no peaches; grapes, 80 per cent; cranberries, 60 per cent.

New Braintree (C. D. Sage). — Indian corn is very late and not more than two-thirds of a full crop. There is very little rowen and fall feed is hardly as good as usual. Potatoes made a fair yield but are rotting somewhat. Root crops, celery and late market-garden crops are very little grown, but have done well. Apples are a fair average crop of good quality; pears a fair crop; peaches the best crop for some years; grapes late in ripening.

Rutland (L. S. Dudley). — Indian corn is not up to former years. Rowen and fall feed are not up to the usual average. Potatoes are a good crop but are rotting somewhat. The prospect is good for root crops, celery and other late market-garden crops. Apples, pears, peaches and grapes are good in most cases.

Petersham (S. B. Cook). — Indian corn is 60 per cent of an average crop. Rowen and fall feed are above the usual average. The usual amount of fall seeding has been done and is in good condition. Yield of potatoes normal, but from one-fourth to one-

third of the crop is affected by rot. There is a good prospect for all root crops and celery. Apples and peaches are about normal crops; pears few.

Hubbardston (C. C. Colby). — Indian corn is only about a two-thirds crop, and early frost did much damage to many fields. Rowen and fall feed are not up to expectations. Very little fall seeding is done in this section. Potatoes are above the normal in yield and of excellent quality. All root crops have made good growth and the yield is above the average. Apples plenty; pears fair; grapes and cranberries damaged by frost.

Templeton (Lucien Gove). — Corn is very poor both in stover and grain and scarce any will mature. Where grass was cut early rowen is quite good. Haying held on so late that scarce any seeding has been done, but where it has been done it is a good stand. Yield of potatoes rather above average, but quality below on account of rot. Root crops are in very fair condition; celery not raised. Full crop of early apples, winter apples good average; pears light; no peaches; grapes light. Squashes, cucumbers, pumpkins and beans very light; full crop of turnips and cabbages.

Royalston (C. A. Stimson). — Indian corn is 50 per cent below an average crop. Rowen and fall feed are up to the usual average. The usual amount of fall seeding has been done and looks finely. There is a large crop of potatoes of good quality, but they are rotting badly. The prospect is good for root crops, celery and other late market-garden crops. There is a good crop of all kinds of fruit except pears.

Westminster (Alden Foskett). — Corn is a very slim crop and nine-tenths of it has not yet ripened. Rowen is good where the crop was cut early; fall feed good. The usual amount of fall seeding has been done and its present condition is very good. Potatoes are A No. 1 in both yield and quality. Root crops of all kinds are yielding well. There is a heavy crop of apples for both fall and winter varieties; almost no pears; peaches a large yield where grown; grapes good.

Fitchburg (Jabez Fisher). — Indian corn has made a good growth, but is at least two weeks late. Rowen and fall feed are very nearly up to the normal and are looking well. About the usual amount of fall seeding has been done and it is looking well. There is a good crop of potatoes of variable quality. Apples about 60 per cent; pears, 25 per cent; peaches, 80 per cent; grapes, 80 per cent. The season is so late that grapes may not mature.

Harvard (J. S. Preston). — Indian corn is not as well filled out as usual. The rowen crop is larger than usual and fall feed looks well. What onions are raised make a very fair crop. Pota-

toes made a large yield and are of good quality. Root crops are good both in quantity and quality. Apples are a large crop of fall varieties, Baldwins not looking very well; pears a light crop; peaches a good yield, but the flavor of the fruit is poor.

Bolton (H. E. Babcock). — Indian corn is very backward, and frost must be late to allow it to ripen. Rowen is above the average and fall feed is up to the average. The usual amount of fall seeding has been done and is in good condition. What onions are raised are a good crop. The prospect for root crops, celery and other late market-garden crops is good. Apples, peaches and grapes are good; pears and cranberries rather below the average.

Auburn (Wm. Gilbert). — Corn is about two-thirds of an average crop. If hay had been cut earlier rowen would have been very heavy, and it is now fully up to the average; fall feed looks well. The onion crop is slightly below the average. Potatoes are fully an average crop both as to quantity and quality. The prospect is good for all late crops. The apple crop is large; pears normal; grapes large.

Hopedale (Delano Patrick). — Corn is very poor except for forage. Rowen was a light crop and fall feed is in average condition. There was a great yield of potatoes but there are signs of rot. The prospect for root crops, celery and other late market-garden crops is good. Early apples and grapes are very abundant; winter apples less than average for the bearing year; pears about average.

MIDDLESEX COUNTY.

Sherborn (N. B. Douglas). — Indian corn is far below the average and very little of it is ripe as yet. Rowen and fall feed are fully up to the average. Not as much seeding has been done as usual, and it is too early to judge as to the outcome. Potatoes are above the average in yield but rot is prevalent. Apples are a good crop, much better than was promised a month ago; very few pears; peaches a very large crop, quality not up to the average; grapes not ripening.

Hopkinton (W. V. Thompson). — Indian corn is a good crop but late. Rowen and fall feed are not up to the usual average. Potatoes are extra good in yield and quality. Turnips and cabbages are good crops. There is a fair crop of apples; no pears; peaches good; some varieties of grapes rotting on the vines, others late; cranberries good.

Sudbury (E. W. Gardner). — Corn is above an average crop. Rowen and fall feed are above the usual average. The onion crop will be below the normal. Potatoes are above the normal in con-

dition and quality. The prospect is excellent for all root crops and other late market-garden crops. Apples, pears, peaches, grapes and cranberries have all turned out well.

Stow (G. W. Bradley). — Corn is not as large a crop as in previous years and does not ripen well. Rowen and fall feed are a little below the average. About the usual amount of fall seeding has been done and it is looking well. There is a large per cent of thick necks in the onions I have seen. There is a good yield of potatoes, but some complaint of injury from grubs. Fruit of all kinds has turned out well and brings fair prices. A good many squashes were sown this season, but frost injured most of them.

Littleton (G. W. Sanderson). — Indian corn is more than an average crop. Rowen and fall feed are up to the usual average. Less than the usual amount of fall seeding has been done and its present condition is excellent. Onions are far below the average. Owing to blight and rot the yield and quality of potatoes are impaired. The prospect is good for root crops, celery and other late market-garden crops. The apple crop is good in quality but not as large as usual in bearing years; small crop of pears; good crop of peaches; grapes and cranberries much below the average.

Groton (Jas. P. Fitch). — Indian corn will be an average crop if given a chance to ripen. Rowen and fall feed are above the usual average. Potatoes made an average yield but are rotting. No root crops raised to speak of. Apples a good crop; no pears; peaches and grapes excellent.

Dunstable (A. J. Gilson). — Corn is below the average in quality but above in quantity. Rowen and fall feed are up to the usual average. Onions are above the normal and of good quality. In quantity potatoes are above the normal, but are far below it in quality owing to rot. The prospect for root crops is good; also other garden crops. In this locality the apple crop is below the normal; no pears; peaches a light crop; grape crop not up to an average; cranberries a good crop.

Carlisle (E. J. Carr). — Indian corn will be above the average if the frost does not take it. Rowen is not quite up to the usual average, but fall feed is above it. Onions are more than an average crop. Potatoes were a big crop, but have rotted badly. Root crops in general are good; not much celery raised. There is a good crop of all fruits except pears.

Billerica (Geo. P. Greenwood). — Indian corn is very late and unsatisfactory. There is about an average crop of rowen. The onion crop is poor. Potatoes are above the normal in yield and quality, but are rotting. Turnips poor; celery good; late cabbage

uneven. Late apples are very uneven; many Baldwins are very poor in quality, while russets are unusually good; pears are a failure; peaches abundant; grapes do not ripen; cranberries are below average and somewhat injured by frost.

Woburn (W. H. Bartlett). — Corn is late and not filled out. Rowen is not quite an average crop, having made a slow and short growth. About the usual amount of fall seeding has been done and it is in good condition, although warm rains would have made it better. Onions are a little below the normal. Early potatoes were better than usual in size and quality. Celery is a better crop than ever and selling lower than usual. Baldwin apples a little over half a crop, early apples plenty; few pears, peaches and grapes. The brown-tail moth is very plenty and doing much damage. The apple trees and many other trees are in many cases covered with the webs; another year at the same increase of this year and they will destroy everything.

Stoneham (J. E. Wiley). — Rowen and fall feed are not up to the usual average. The usual amount of fall seeding has been done and it is rather backward. Potatoes are above average in yield, but are rotting badly. The prospect for root crops, celery and other late market-garden crops is very good. Apples good; pears and peaches fair; grapes good.

Winchester (S. S. Symmes). — Rowen is a fine crop and fall feed is in good condition. Grass seed came up in good shape and is growing all right. Potatoes were never better, a large crop and of fine quality. Beets and turnips are good; celery good; cauliflower and cabbage promise well. Great crop of apples; tremendous yield of peaches of unusual quality; pears not heavy; grapes good. Nearly every tree in this section is covered with the young brown-tail moth caterpillars, and the eggs of the gypsy moth are to be seen everywhere.

Weston (H. L. Brown). — Corn has made good growth, but is very backward and is now in the milk. Rowen is a good crop, but cannot be secured on account of dull weather. Not much seeding has been done as yet. Potatoes have made a good yield and are of extra quality. Not much celery is grown; root crops good, as are other late market-garden crops. Many fall apples, not a large crop of winter ones; pears and peaches about average crops; late squashes very backward, as are all crops that need warm sunshine.

ESSEX COUNTY.

Amesbury (F. W. Sargent). — Indian corn is hardly 50 per cent of an average crop. Rowen and fall feed are both better than an average. There has been but very little new seeding as yet. There is a large crop of onions, but they are not ripening down well. Potatoes are an abundant crop, but are rotting in some places. Celery and cabbage are very fine and are growing to large size. Apples and peaches are plenty; grapes not ripening.

Haverhill (Eben Webster). — Corn is a little short of an average and very late. Rowen and fall feed are nearly up to the average. About the usual amount of fall seeding has been done and it is looking well. Potatoes are of good quantity and quality, but late ones rot somewhat. The prospect for root crops, celery and other late market-garden crops is very good. Apples are a two-thirds crop; pears very light; peaches a large crop.

Groveland (Abel Stickney). — Indian corn is not more than half an average crop. Rowen and fall feed are a full average. About the usual amount of full seeding has been done and it looks very well. Onions are a good crop. Quality of potatoes fine and yield good unless rot spreads. The prospect for root crops, celery and other late market-garden crops is very good. Apples good; pears quite good; peaches great; grapes good.

Rowley (D. H. O'Brien). — Corn is about half a crop. Rowen and fall feed are up to the usual average. Onions are a little below the average. The yield of potatoes is much better than usual, but they are rotting badly in some sections. Root crops, celery and other late market-garden crops promise better than usual. Apples are about a two-thirds crop; pears below the average; peaches about normal; grapes very heavy; two-thirds of the cranberry crop spoiled by early frost.

Newbury (Geo. W. Adams). — Indian corn is a little below the average but is gaining. Rowen and fall feed are in fair average condition but are a little late. The average amount of fall seeding has been done and is in good condition. Onions are nearly a full crop. Potatoes are a good crop, but are rotting somewhat. The prospect is excellent for root crops, celery and late market-garden crops. Apples, 30 per cent; pears, 20; peaches and grapes, 100; cranberries, 75.

Topsfield (B. P. Pike). — Corn is not filling out as well as usual. Rowen is not a full crop but is about an average one; fall feed looks well. Onions are a good crop. Potatoes are good in yield and quality. Apples are more than a full crop; peaches the largest crop for years; grapes large crop.

Danvers (C. H. Preston) — Indian corn is good in many places and uneven in others. Rowen and fall feed are up to the usual average. The usual amount of fall seeding has been done and is in good condition. Onions are a good crop. There is a good yield of potatoes, but some rot. Root crops, celery and other late market-garden crops promise very well. Apples good; pears scarce; peaches plenty; grapes fair.

NORFOLK COUNTY.

Randolph (R. A. Thayer). — Indian corn is about two-thirds of an average crop. Rowen is three-fourths of a crop and fall feed about as usual. The weather has been good for fall seeding and the young grass is promising. Onions are about 80 per cent of a full crop. There is a full crop of potatoes of a fine quality. Celery very fine; squashes about half a crop; tomatoes do not ripen well; other market-garden crops as usual. Apples good; pears half a crop; peaches good; grapes plenty but do not ripen well; potatoes are rotting very badly.

Stoughton (C. F. Curtis). — Corn grown for grain from early planting will yield an average crop; silo corn will not have the ears filled out as usual. The rowen crop is short, but fall feed is up to the average. Fall seeding is behind hand, but what has been put in is doing better than usual. Apples are doing well; grapes late in ripening.

Canton (E. V. Kinsley). — Corn is a fair average crop, but is ripening slowly. Rowen is rather light, but fall feed is coming along finely. The usual amount of fall seeding has been done, a very good stand being made, winter rye doing very well. Onions are an average crop. All late crops, including beets and turnips, are very vigorous and promise well. Apples not gathered, a great crop on the trees; pears light; peaches and grapes good; cranberries light.

Walpole (E. L. Shepard). — Indian corn is below the average, plenty of fodder, but few ears. Rowen and fall feed are up to the usual average. The usual amount of fall seeding has not been done, but its condition is fair. Onions are not raised. Potatoes are good crops in yield and quality. Root crops are not up to the normal and late garden crops are poor. Apples, peaches and grapes good; pears light; cranberries very poor.

Norfolk (A. D. Towne). — Corn is not cut as yet and will hardly be an average crop; some damage from frost. On moist land rowen has been good but on dry land there is none; fall feed is in rather poor condition. Onions are a better crop than usual.

Potatoes are yielding well and are of good quality, but some fields have rotted badly. Apples are hanging on the trees well; very few pears; peaches and grapes yielding well.

Millis (E. F. Richardson). — Indian corn is a good crop. Rowen and fall feed are up to the usual average. Onions are an average crop. Potatoes would have been a large yield but were injured by rot and worms. The prospect is good for root crops, celery and other late market-garden crops. Apples and grapes are large crops; other fruits fair.

Medway (Monroe Morse). — Indian corn is not up to an average crop. Rowen and fall feed are just about up to the usual average. Potatoes are very good in yield and quality. Apples are a full crop; pears a one-third crop; peaches a full crop; grapes a three-fourths crop.

BRISTOL COUNTY.

Easton (H. M. Thompson). — Indian corn is a good crop. Rowen and fall feed are up to the usual average. The usual amount of fall seeding has been done and it has been somewhat damaged by frost. Potatoes are fully up to the standard in yield and quality. The prospect is good for root crops, celery and late market-garden crops. Apples plenty; pears few; peaches fair; grapes and cranberries good. Poultry looks well; eggs 32 cents a dozen at the door; swine scarce at good prices.

Mansfield (Wm. C. Winter). — Corn will be under average in yield but much better than was anticipated. Rowen is not generally cut but will be about an average crop. Pastures have been generally good and less fall feeding has been required than usual. Potatoes are about a normal crop, some little rot but quality generally excellent. Outlook excellent for all root crops and late market-garden crops. Apples good; pears fair; peaches generally good; cranberries uncertain. Cucumbers have generally gone with rust but squashes are doing finely.

Attleboro (Isaac Alger). — Indian corn is a good average crop. Rowen and fall feed are up to the usual average. The usual amount of fall seeding has been done and is in good condition. Potatoes are a full average crop. The prospect is good for root crops, celery and other late market-garden crops. Apples are the finest for years; cranberries a very small crop, not more than one-third as many as last season, but of good quality.

Raynham (N. W. Shaw). — Corn is above the average for the past few years. Rowen and fall feed are above the usual average of condition. The usual amount of fall seeding has been done

and is in good condition. Potatoes are average crops in yield and quality. The prospect is good for root crops, celery and late market-garden crops. Apples abundant; pears few; peaches average; grapes good but late; cranberries good but the frost has caught them.

Acushnet (M. S. Douglas). — There will be about a two-thirds crop of Indian corn. Rowen and fall feed are not up to the usual average, owing to dry weather. Less than the usual amount of fall seeding has been done and it is not in good condition. Onions are about a normal crop. Potatoes have been more than a normal crop of excellent quality. Celery is looking well, also root crops; weather just right for crops on low land. Apples a large crop; no pears; peaches and grapes good; about two-thirds of a cranberry crop.

PLYMOUTH COUNTY.

Marshfield (J. H. Bourne). — Indian corn is very much below last year's crop, the ears not being filled out as well or as well ripened. Rowen and fall feed are not up to the usual average. The usual amount of fall seeding has been done, but the dry weather has kept it from starting fully and it is backward. Onions are not up to the normal. Potatoes are a good crop in both yield and quality, with not much rot. The weather has been too dry to carry root crops, celery and other late market-garden crops out fully, and rain will hardly bring them up to the average. Apples very abundant and fair; pears less than usual; also peaches; grapes a little extra; cranberries about half a crop.

West Bridgewater (C. P. Howard). — Corn is a much smaller crop than last year per acre, but more was planted this year. Rowen and fall feed are up to the usual average. About the average amount of fall seeding has been done. There is a large crop of potatoes of good quality, but they are rotting badly. Root crops, celery and other late market-garden crops are growing well. There is a large crop of good apples; peaches are plenty; so are cranberries.

Bridgewater (Rowland Cass). — Some fields of corn good, others poor; crop below the average as a whole. Rowen and fall feed are below the average. Less than the usual amount of fall seeding has been done and it is backward. Onions are a good average crop in size and quality. Potatoes are above the normal in yield, quality good. Root crops are looking well; squashes good, also garden crops in general. Apples and peaches are above average crops; grapes good; cranberries poor.

Plympton (Winthrop Fillebrown). — Indian corn is about an

average crop. Rowen and fall feed are not up to the usual average. Onions are a better crop than usual. The yield of potatoes is about normal, but the quality is poor on account of rot. The prospect for root crops, celery and late market-garden crops is very good. Apples, pears, peaches and grapes are in excess of the normal; cranberries about 60 per cent of an average crop.

Carver (J. A. Vaughan). — Indian corn is an average crop. Rowen and fall feed are up to the usual average. The onion crop is a good average one. Potatoes made an extra large yield and are of good quality. The prospect for root crops, celery and other late market-garden crops is good. There is a good apple crop, some peaches and a few pears. The cranberry crop is nearly all harvested and will not be half as large as last year.

Lakeville (N. G. Staples). — Indian corn is a fair crop. Rowen and fall feed are not quite up to the usual average. Onions are a little better than a normal crop. Potatoes are a good crop in yield and quality. Apples abundant; pears few; peaches extra; cranberries good; grapes extra.

Rochester (Geo. H. Randall). — Corn is perhaps half of an average crop, owing to drought and cold nights. Rowen and fall feed are below the average owing to drought. Onions are a good crop. Potatoes are extra good in yield and quality. Root crops, celery and other late market-garden crops will be very light. Fruit is very good with the exception of pears. Cranberries very good on some bogs and very light on others.

BARNSTABLE COUNTY.

Bourne (D. D. Nye). — Indian corn is a good crop. Rowen and fall feed are better than last year. About the usual amount of fall seeding has been done and it is in very good condition. Onions are little raised. Potatoes are doing finely as a general thing. The prospect for root crops, celery and other late market-garden crops is very good. Apples better than last year; pears about average; very few peaches and grapes; cranberries better than last year on some bogs and not as good on others.

Mashpee (W. F. Hammond). — There is about an average crop of Indian corn. Rowen and fall feed are up to the usual average. The onion crop is below the average. Potatoes are above the average in yield and quality. Root crops and late market-garden crops will be above an average yield. Apples, pears and peaches half-crops; cranberries a three-eighths crop.

Dennis (Joshua Crowell). — Indian corn is below the average. Rowen and fall feed are not up to the usual average. Very little

fall seeding has been done. Onions are a little below the normal. Potatoes compare favorably with the normal in yield and quality. The prospect for root crops, celery and other late market-garden crops is fair. Apples good; cranberries, taken as a whole, much below the average.

Chatham (E. Z. Ryder). — Corn is about half of an average crop. Rowen and fall feed are hardly up to the average, owing to the dry weather in August and September. Less than the usual amount of seeding has been done. Onions will be a larger crop than usual. Potatoes are the largest crop for many years and of excellent quality. Late root crops are in good condition and promise well. Apples are a large crop; grapes an average crop; cranberries uneven, some bogs having a large yield and others with small crops, and in some cases with almost nothing, probably less than the average on the whole.

Eastham (J. A. Clark). — More corn than usual was planted and is looking well. Rowen and fall feed are not up to the usual average. Potatoes are better than an average crop in yield and quality. Turnips are our main root crop, and owing to dry weather at planting did not come up well; looking well now but late. Apples fair; pears light; cranberries light.

Truro (D. E. Paine). — Rowen and fall feed are not quite up to the usual average. The usual amount of fall seeding has been done and it is in fair condition. Onions are a fair crop. Potatoes are a good crop in yield and quality. Root crops, celery and other late market-garden crops are looking very well. There is not half a crop of fruit.

BULLETIN OF

MASSACHUSETTS BOARD OF AGRICULTURE.

IMPROVEMENT OF PASTURES.

By Prof. J. W. SANBORN *of Gilmanton, N. H., formerly Director of the Missouri Agricultural Experiment Station, President of the Utah Agricultural College and Director of the Utah Agricultural Experiment Station.*

The older members of a generation of farmers now passing away tell us that New England pastures have greatly deteriorated in their day. That in their earlier days cattle grew more rapidly at pasture than now, fattened into finished beef, and that the profits of beef production depended largely upon pasture feed. At present, on the average pasture, by dint of hard work stock may make a short growth, and on the better class of pastures a low grade of beef. Pastures have ceased to be the measure of the profits on animal products and cannot be associated with successful intensive methods in animal husbandry. It is a prerequisite of such husbandry that an abundance of palatable and nutritious food be supplied. Three to four fold the area is required that should be to fittingly pasture a fatting steer, while the herbage is neither as palatable nor as nutritious as it should be. Weeds and brakes divide the annual supply of plant food and shade the grass. It is found that such grass, or shade grown grass, contains more moisture and inorganic protein materials, and is less palatable than the grass of the open, under the full influence of the sun's rays.

The fact that the dense rich mat of grass of our early pastures has given place to bushes and weeds is evidence of change and deterioration. Sir John B. Lawes changed the ratio of the several grasses and clovers and even the per cent of weeds by varying the chemicals applied. On plats of grass treated for several years to dissimilar chemicals I found timothy preponderating on some, clover on others and white top on others. On my grass plats this year on which no nitrogen had been applied with the minerals for years golden rod was abundant, while the plat having a half ration of nitrogen contained some of this weed, but none was found in

the section where nitrogen was used in full formula. The record of the decline of our pastures is read on their face. Weeds, bushes and change in character of grasses tell us of a century's flow of nitrogen, lime and phosphoric acid from the soil, and in their character tell us too that these have not gone in proportionate amounts.

Where 1,000 pounds of beef are removed from the pastures there goes 1.8 pounds of potash, 25.2 pounds of nitrogen, 19.2 pounds of phosphoric acid and 21.4 pounds of lime. As potash is much more abundant in the soil than phosphoric acid, it will be seen that selling beef is selling out of the pasture phosphoric acid in greatly undue ratio, while lime and nitrogen go at a good pace.

The sale of milk, too, is a sale of the phosphate of our soils in ratio to total supply faster than potash, — 1,000 pounds containing 5.3 pounds of nitrogen, 1.9 pounds of phosphoric acid and 1.8 pounds of potash. Here, however, it is nitrogen that is taken in largest amount, the material that grasses find it most difficult to obtain.

Pastures Dead Property.

This drain of phosphates and change of herbage has left so little of easily available and palatable foods that animals will not eat excess food enough, as set forth in the bulletin of this Board for July, for a growth yielding economic results. Growth has been reduced per season to from 150 to 175 pounds, and on the best pastures 200 pounds. Such growth has involved so much of labor that cattle will consume only little more than food of maintenance rather than endure more strain in securing food. The growth obtained must go into the class of low-selling beef, with the result that the revenue will not average over $1.20 to $1.40 per acre, — little more than taxes and care of pasture. Indeed, we should be better off without them, as dependence upon them compels the sale of a lower grade of beef than can possibly yield a profit, and compels us to winter stock once or twice too often, thus lengthening the period during which maintenance rations must be fed, thereby absorbing all or more than all of the apparent profits of pastures. This view might be set forth by mathematical calculations, yet so many problems are involved that the question may perhaps as well be left for reflection, and to the general knowledge that the old system of wintering stock without growth, or on mere maintenance rations, for the good growth then cheaply made on pastures is giving way before the fact that our poor pastures no longer compensate for poor barn feeding, and the further fact of no net returns per acre of pasture nor none from the whole system of

summer and winter feeding where the old type of winter feeding for pasture fattening prevails.

It is said that a Lancastershire English pasture will make five hundred pounds of growth in a season per acre. Here it will take ten-fold this area on the average pasture. We cannot afford to farm on this level with large areas of our holdings practically idle. Pasture lands must be put to work and to good work. Where this is done there will come with it a great widening of our business.

How Can it be Done?

The common advice to cut the bushes and weeds is correct so far as it goes, but it only treats the effect of the disease and not its cause. At best, the process can only enlarge the area of poor soil that is available and let the sun in on the shaded grass to sweeten it. This work of restricting pastures to grass, as against bushes and weeds, must be done as an initial step. When the soil is handled for grass, and the bushes cut a few times in August and the weeds kept back, grass will gain a hold and retain it. The persistent recommendation to seed pastures anew and work the seed in is a temporizing expedient. Seed is not fertility nor can it replace it, and though successfully started will not long hold the soil, as against the grass to which the soil has become adapted for reasons already noted. The thoughtless advice to burn over the pasture in the fall and spring fails to note the burning of the nitrogen compounds and the wastage into the air, and, however carefully done, the injury to roots. Some unwanted seeds or annuals may be injured, but the conditions that breed or harbor them are left. Fertility and fertility of the right sort must characterize a good soil. Plants can no more make uniform vigorous growth without abundance of proper food.

How to Fertilize.

Plant food may be applied in yard manure, and if accompanied by new and right seed and with a surface cleared of weeds will give in time a good mat of pasture grass. The process will fall within common knowledge. As all or approximately all New England farmers are hard taxed to obtain manure enough for their fields, this method may as well be passed by at the present stage of pasture development.

Grain feeding on pastures, with partial reference to improving them, is an English custom. Sir John B. Lawes has shown by trials that such pastures when turned for staple crops are more productive than those not thus treated. Trials by the writer in Missouri and New Hampshire, and by the experiment stations of Illinois,

New York and other States, have not shown a direct compensation in growth or in milk for grain fed to steers or cows during the best months of grazing. It is assumed by many competent authorities that the increased vigor of animals thus fed will in the end place the balance sheet on the right side of grain feeding at pastures. This, I must grant, is an unsolved problem from the purely mathematical side. But when the whole problem is viewed in its relation to soil fertility, or increased yield of crops, and ease of securing daily food, palatability and nutritive value of food and sale value of beef are considered, the balance it appears must be on the right side. I say appears, for the whole question is as yet not worked out and definite figures cannot be given; but its end may be and should be as follows: on one side an acre carrying a steer and producing 300 to 350 pounds growth salable at top prices, and on the other, four to six acres producing but little over one-half this growth, that must sell in a second or third class market. The process is, however, a slow one for our times and necessities, but a worthy one. It betters the conditions of pastures that we desire to make good or to gradually improve. It moves in the right direction.

Chemical Fertilizers.

I have a field on top of a ridge, where it receives neither workings nor seepage, bearing its twenty-eighth crop since yard manuring and twenty-fourth crop continuously to chemicals. It is now carrying evidence that chemicals act as direct plant food and not as stimulants, and that they are adequate plant food for long periods and probably for generations. By their use immediate results are secured. I have a two-acre pasture, treated to chemicals three times, through which 80 cows pass to the main pasture, but never until it is grazed over. To it they return after passing to the brook and drinking. I have sown strips of chemicals through grazing lots, and on such strips the cows soon congregate. These strips give more and sweeter grass, and, it is believed, more effective grass.

The quantity annually required is not large after the first good growth is secured. There is taken off in 2,000 pounds of milk but 10.6 pounds of nitrogen. But as the annual nitrogen supply brought to pastures by rains may be about half this amount, and as probably more is secured by other processes, and as at least half the food taken by a cow is voided in the pasture, the annual deficit may be covered by from 3 to 5 pounds, if, indeed, there is a deficit of this material. However, there are or may be leachings from the soil in small amounts. Only 3.8 pounds of potash passes off in 2,000 pounds of milk, — an amount that on granite soils

may be largely supplied by soil decomposition. The phosphoric acid is of more importance, although but 3.6 pounds are found in 2,000 pounds of milk. Phosphoric acid is very hard of solution, is in meagre amount in the soil, and in practice found very pronouncedly effective when applied. In previous data given it was seen that steers take this material away very liberally. It is associated with lime and is the basis of bone structure.

After calculating the fertilizer supply of grazing stock left as voiding, the annual deficit may be supplied and probably more than supplied by 15 to 20 pounds nitrate of soda, 3 to 4 pounds muriate of potash, and 15 pounds acid phosphate containing 14 per cent phosphoric acid. The whole should not cost more than 55 to 60 cents. But no practical man would begin their use with but 33 pounds of chemicals annually. I named 500 pounds annually in the July report, with an annual reduction thereafter. One hundred and twenty-five to 150 pounds annually would give marked results; would double the grazing value of an acre in a brief period. I named large amounts in the July report for intensive work, and no doubt more than most will care to venture to use. On rough pastures, where the spreading must be by hand, a larger quantity, answering for several years may be used, in which case more insoluble forms than those above named will be required. Tankage supplemented by ashes, or by 14 pounds muriate of potash to 100 pounds tankage, would make an advantageous fertilizer. Bone meal is an old and tried pasture specific. For steer grazing, as little potash is withdrawn by them, this would answer alone for good pasture, but not for maximum results, nor would it do so well for cow pasture without blood or nitrate of soda annually. The influence of half a ton of tankage or bone meal would be seen for years. It is, of course, understood that a cleared pasture, and, in the absence of the right sort of grass, new seed, are to be secured. It is of considerable importance to the dairy farmer that the increased growth of pasture grass aid the fields. The droppings in the barn or yard at night are increased and pass to the fields. It should also be noted that chemicals may be better adapted to pasture fertilization than yard manure, especially where steers graze, from the fact that any proportion of nitrogen, potash or phosphoric acid may be used. Steer pasture needs little but phosphoric acid, and for these, where heavy applications are made, bone meal will answer fairly well for a few years. Some nitrate of soda or blood would be needed as the years pass by.

Chemicals and Barn Feeding.

The combination of barn feeding as a source of pasture fertility with chemical fertilization presents some points of advantage. It is often asked how are we to keep the bushes and weeds back after cutting. While continuous August cutting will soon kill bushes it is an advantage to gain the assistance of stock. Where stock is partly fed at the barn they are more likely to crop lower the green things at pasture and to hold bushes back. The chemicals rightly used call out the grasses, and these crowd closer the weeds, while an over-stocked pasture is certain to have its weeds closer fed. Chemical fertilization will soon show a pasture of clean grass sward, and quicker, if animals are barn fed in part. In my own practice all pastures available for fields have been taken in for ploughing, and I am compelled to barn feed in part. I find an advantage in this system as in some trials it appeared that a fodder of dry matter daily was advantageous to grazing stock. Theoretically, a cow or steer is obliged to take in more water than is required if enough grass of 75 per cent water is taken to furnish all the nutrition required, — 110 to 120 pounds of grass being required. In cool days in early spring and in the fall or late summer there would be a material excess of water to vaporize and throw off the body. This requires food to do it. It is not a vital point, yet one of the lesser economic questions involved.

Rotation with Fields.

I am pressing all the available pasture ground and woodland not essential to the farm into fields, and in an eight years' rotation assigning one year for pasturage. By this system one-eighth of the tillage area is always in pasture, and in good pasture, as it is manured the year before grazing, indeed, every year.

This system has an advantage over fertilizing an old pasture in that new and vigorous plants are fed that are responsive. Also, aeration and decomposition of soil by the process of aeration add to the available plant food of the soil. Nitrogen accumulates under a grass sward and so closes the soil to atmospheric agencies that the process of decomposition becomes very slow. Grass sward then gains less for its annual use through nature than tillage land. The turning of such a sward helps other crops to plant food, and through the solution of the elements of plant food soil opened and tilled is itself aided. In any good rotation more plant food is taken from land than would be the case if the ground was occupied by grass. These assertions stated dogmatically rest upon well

taken data, all of which cannot be crowded into a brief paper. A good rotation in the hands of a good farmer should average three tons to the acre, — adequate amount to feed a cow and a half for a pasture season of five months. By it more cows can be kept than by the pasture system under chemical fertilization. In accordance with previous suggestions I pasture one-eighth the tillage lands and use a part of the tillage crops to supplement the untillable pasture areas, feeding as dry food at barn.

The system has an apparent defect. It uses this area but one year and follows timothy grown as a sale crop. Timothy is said not to make a good grazing grass on account of its bulbous enlargement at the base of the stem, liable to injury by grazing and trampling, and to its disinclination to throw up a good second crop or to grow after cutting. But grazing deals with the young plant and not one that has matured a hard stem. With me the system works very well. Others will raise the question of the vital importance of mixed grasses in grazing and insist on soiling as a substitute for grazing. The first point is considered below, while of the second it is enough to state that I am dealing with grazing improved areas. However, it may be said that soiling has its drawbacks of a serious nature, and has not as yet met the approval of but a mere fraction of farmers after many years of debate and use. At best it is but a debatable system and one that I have not deemed best to incorporate to any material degree in my farm policy.

Grasses for Pastures.

It is an old and insistent contention of authorities that a mixed grass sward yields more and better food than a single grass can. The varieties root differently, mature their grasses at different times, are some of them best in dry seasons, others in wet seasons, differ in composition, digestibility and palatableness and form a sort of rotation when mixed. The reasoning is logical and cogent on the face of it, yet may have an exaggerated importance. It costs more to seed mixed grasses, by a heavy margin, and while a mixed grass sward carries more plants to the acre, it must be remembered that great yielders if mixed with lesser sorts may have their number of plants per acre reduced, and possibly thereby to this extent the yield reduced.

But an abstract reasoning is an unsafe guide of action. I made in Utah a trial of nine varieties of grass and clover, and all of these mixed. These were sown on measured acres, fenced and grazed separately at the same time by weighed steers of equal age and similar weights. Two steers were fed on a half acre each lot

until the grass was used up. The ground was naturally poor and rather over-stocked. The gain per steer per day for each kind of grass as the average of two years' trial was as follows: —

	Pounds.
English rye grass,	.78
Orchard grass,	1.24
Tall oat grass,	1.73
Meadow fescue,	1.25
Timothy,	1.42
Meadow foxtail,	loss
Kentucky blue grass,	.87
Red top,	.47
Lucerne or alfalfa,	1.39
Mixture of above varieties,	2.20

The above kinds included the great producing sorts and the most popular kinds for grazing. The point of chief importance is that the most productive kinds gave the best results, although they are not classed as the best grazing sorts. Timothy made a good showing for a grass that has stood theoretically at the foot in popular opinion as a grazing grass. The mixture for the two years' trial justifies popular views, yet it is seen that a single kind may give good results. I would caution the reader against drawing final conclusions, and especially from assuming that tall oat grass is the best grazing variety. It is, however, a grass that sends up a second crop quickly and vigorously, being a heavy yielder.

One sowing down for pasturage to remain a few years should not hesitate in using mixtures. My experience with varieties leads me to advise the use of the great yielders in the table above, excluding English rye grass, Kentucky blue grass on our granite soils, meadow foxtail unless for moist soils, and alfalfa unless for soils with open subsoils and limestone origin. Red top and Rhode Island bent grass may be included for New England soils, especially if a little moist. In reseeding a rough pasture, to remain permanent for grazing, it is common to use a spiked toothed or a smoothing harrow when the soil is moist in the spring, or in wet times in early fall. Mixtures for such a pasture, or one intended for a few years' use, include white clover and often red clover. Red clover is a biennial, and of course soon dies out. Alsike clover is a perennial, and holds well to the soil, standing our winters well.

It is common to give tables of the amounts of each kind to be sown per acre and to sow heavily. Whatever the ratio of the mixture the proportion will soon vary from the original to adjust itself to environment, soil, fertilization and even to seasons.

It is common in the western States, or especially in the southern

belt of western States, to hold some pasture area unfed, or practically unfed, until fall, or even well along towards winter, and to save some grass over for an early spring bite. Under some conditions this is not a bad practice. By this practice, or by understocking, cattle can be grazed later in the fall and earlier in the spring. In intensive farming this may not be the best method, but under some conditions is advantageous. My earliest beef has been made in a pasture where a heavy growth was left over and utilized for an April pasture. The mixture of the green grass of spring with that wintered over kept the bowels in good order, and growth was continuous from the start.

Where Kentucky blue grass thrives it makes the best of winter grass. I have seen it under snow green and inviting to cattle. On places to which it is adapted it should be sown for late and early grazing.

In recapitulation as at present advised I would clear all pasture ground incapable of tillage of weeds and bushes, sow the ground to mixed varieties of grass seed and to chemicals, and at least for a time partly barn feed. All land suitable for tillage should be taken into a rotation with fields and made very productive.

Other and less effective systems may be adopted, some of them incorporated as partial modifications of either of the above systems. It is imperative that some system of improvement that is comparatively quick in action be taken up at once.

SERIES OF 1902. BULLETIN NO. 6.

MASSACHUSETTS

CROP REPORT

FOR THE

MONTH OF OCTOBER, 1902.

ISSUED BY

J. W. STOCKWELL,

SECRETARY STATE BOARD OF AGRICULTURE.

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Crop Report for the Month of October, 1902.

Office of State Board of Agriculture,
Boston, Mass., Nov. 1, 1902.

Bulletin No. 6, Crop Report for the month of October, is herewith presented as the final issue of the season. We wish to thank our correspondents for the assistance that has made the issuing of these bulletins possible, and we shall look to them when another growing season comes for the same measure of effective and interested work.

The special articles printed this year have been: Bulletin No. 1, "Cucumber growing in Massachusetts," by Dr. George E. Stone; Bulletin No. 2, "Three common orchard scales," by Prof. H. T. Fernald (reprinted from Crop Report for May, 1901); Bulletin No. 3, "Beef production in New England," by Prof. J. W. Sanborn; Bulletin No. 4, "Some inexpensive ways of making farm poultry more profitable," by John H. Robinson; and Bulletin No. 5, "Improvement of pastures," by Prof. J. W. Sanborn. Particular attention is called to the bulletin article on "Greenhouse construction and management," by Prof. S. T. Maynard, formerly professor of horticulture at the Massachusetts Agricultural College, which will be found printed at the close of this bulletin.

Progress of the Season.

The October report of the statistician of the United States Department of Agriculture (Crop Report for October, 1901) shows the average condition of corn on October 1 to have been 79.6, as compared with 84.3 a month previous, 52.1 on Oct. 1, 1901, 78.2 at the corresponding date in 1900, and 77.7, the mean of the October averages of the last ten years.

The preliminary estimate of the average yield per acre of spring wheat was 14.4 bushels, and the average quality was 87.7.

The preliminary estimate of the average yield per acre of oats was 34.5 bushels, as compared with 25.1 last year, 29.6 in 1900, and 26.8, the mean of the October estimates of the past ten years, the present estimate being the largest ever reported. The average quality was 86.7, against 83.7 last year and 89.2 in 1900.

The preliminary estimate of the yield per acre of barley was 29 bushels, against 24.7 on October 1 of last year, 20.4 in 1900, and 23.3, the mean of the October estimates of the last ten years. The average for quality was 87.3, against 89.2 last year and 82.1 in 1900.

The preliminary estimate of the yield per acre of rye was 17 bushels, as compared with 15.1 last year, 15.1 in 1900, and 14.4, the mean of the October estimates of the last ten years. The average for quality was 91.8, against 89.4 last year and 92 in 1900.

The average condition of buckwheat on October 1 was 80.5, as compared with 86.4 last month, 90.5 in 1901, 72.8 in 1900, and 80.2, the mean of the averages of the last ten years.

All the important tobacco-producing States, except Ohio, in which State the condition is the same as last month, report improvements in condition during September.

The average condition of potatoes on October 1 was 82.5, against 89.1 the previous month, 54 last year, 74.4 at the corresponding date in 1900, and 71.6, the mean of the averages of the last ten years.

All the important sugar-cane-producing States, except Texas, report conditions below their ten-year averages.

As to the condition of apples, North Carolina reports 8 points, Illinois 9, Missouri 10, Pennsylvania 11, Maine 12, New York 15, Iowa 16, and Michigan 27 points above, and Ohio 2, Indiana 3, Virginia 9, Tennessee 11, Kentucky 19, and Kansas 21 points below the mean of the October averages of the past seven years.

The estimated yield of hops in pounds per acre is 1,267 in Washington, 1,400 in California, 1,100 in Oregon, 1,300 in Wisconsin, and 325 in New York.

The average condition of cotton on September 25 was

58.3, as compared with 64 on August 26, 61.4 on Sept. 25, 1901, 67 on Oct. 1, 1900, and a ten-year average of 68.9.

In Massachusetts the average condition of corn October 1 was given as 77; the average yield of oats as 29, and the average quality as 92; the average yield of rye as 15.2, and the average quality as 93; the average condition of buckwheat as 80; the average condition of tobacco as 95; the average condition of potatoes as 88; and the average condition of apples as 90.

Massachusetts Weather, 1902.

[Compiled from data furnished by the New England Weather Service.]

The weather during January was uneventful and unusually pleasant for the midwinter season. There was much sunshine and precipitation in measurable amounts on an average of eight days. The precipitation was below the average in all sections, although it was quite well distributed. The chief feature in connection with this element was the snowfall, which was far below the average for this month. The average for the State was 8.5 inches, which is several inches below the usual amount for January; but, owing to the uniformly low temperature, the mean of which was 1.5° below the normal for the month, the ground was well covered with snow giving good sleighing most of the period.

The weather of February was typical of the month. There were several storms of marked intensity, accompanied by general and heavy precipitation, with high winds and gales. The most conspicuous of these occurred on the 2d and 17th. The rain and attending high temperature caused a rapid melting of the snow on the ground, and the result was swollen rivers and streams. Fortunately, the depth of snow was not great and the damage from high water not great or general. The monthly precipitation was nearly 2 inches above the normal. The temperature ranged near the seasonable average, without notable features in the extremes.

March was generally unseasonable, some of the weather elements departing greatly from the monthly average. The most important departures were in the temperature and the precipitation. The monthly mean of the former was 8° above

the normal, and in some localities the excess amounted to 10°. The excess in precipitation was less marked, although general in all sections. The snowfall, as in the preceding month, was light.

Generally speaking, April was a pleasant month. The weather was mild, with the temperature above the average, the excess amounting to about 2°. There was less than the customary amount of sunshine, but notwithstanding the extensive cloudiness, rain fell on an average of but nine days. The monthly precipitation was somewhat above the normal, the amounts ranging from 1 to 2½ inches. There was no snowfall worthy of mention, the amounts being generally too small to measure. Thunder-storms were of general occurrence on the 26th and 30th.

May opened with an excess of cloudiness and the rainfall for the first week averaged more than an inch. Owing to the general dampness the week seemed cool, though the average temperature was several degrees in excess of the seasonal. A cool wave occurred on the 10th and 11th, and caused very general frosts, which, owing to high winds, were not generally destructive. The precipitation during the second week was below the average. The nights of the third week were notably cool, with light frosts in many sections. There was, however, an abundance of sunshine and a corresponding deficiency in the amount of rainfall. The weather during the closing days of the month was without special or unusual features. The nights were cool in the first part of the period, but these were followed by some warm days, the temperature on the 23d rising to almost unparalleled figures for the season.

June opened with several warm days, and the weather conditions were very favorable and seasonal. The temperature during the first and second days ranged in the 90's in many sections. Before the close of the first week, however, there was a sharp drop in the mercury, and the weather was cooler than is usual for the season for the remainder of the month. The nights were, as a rule, exceptionally cool, and there were reports of light frosts in some localities. During the first ten days of the month the rainfall was quite

equally distributed, and the conditions as regarded moisture were near normal. From the 10th to the 22d little rain fell in the eastern sections of the State. Copious showers and rains occurred during the closing week of the month in nearly all sections, and the droughty conditions were relieved. A conspicuous feature of the weather was an absence of the usual number of thunder-storms. Viewed as a whole, the weather of the month was unusually cool, but very pleasant.

The rainfall of the first week of July was seasonal and not in excess, but, owing to the uniformly low temperature, more sunshine was needed. The week ending the 14th was somewhat changeable, but the weather was generally fair, with a larger per cent of sunshine and a corresponding increase in temperature, although there was general complaint of cool nights. From the 15th to the 22d the weather was quite seasonal. The temperature was somewhat below the weekly normal, but the departure was unimportant. The closing week of the month was exceptionally unfavorable. The skies were almost continuously overcast, with frequent light rains and showers. The temperature, owing to cloudiness and ocean winds, was low. The month as a whole was abnormally cool, with much unpleasant weather.

August opened with several days of typical "dog day" weather, with a large excess of humidity and temperatures ranging in the 80's. From the 6th to the 12th inclusive the weather was unsettled, showers and local storms were prevalent, and the rainfall in some localities was considerably in excess of the average. The temperature during the time was quite uniform, rising but little above 80 degrees. The nights were especially cool, the temperature conditions being mostly unfavorable to vegetable growth. Fair weather, during which there was much sunshine, obtained from the 13th to the 18th. The temperatures, however, remained unseasonably low, the daily means ranging from 1 to 6 degrees below the normal. The weather during the remainder of the month was rather uneven, but for the whole State the temperatures were notably below the seasonal averages. Summed up as a whole, the weather of the month was phenomenally cool. The rainfall of the month was generally

deficient, although well distributed, and there was less than the usual amount of sunshine.

The month opened with warm, sunny weather. The temperature ranged from 5 to 10 degrees above normal for the first four days of September, rising to the 90's in many sections on the first and second days. General rains followed on the 4th and decidedly lower temperatures by the 6th, when frosts occurred in many sections of the State. The cool weather was of short duration, the temperature climbing to the 80's during the 8th and 9th, when it ranged several degrees above the seasonal average. The high temperature was also of short duration, the mercury falling to the 50's on the 10th. The remainder of the month was slightly cooler than the average. The rainfall of the month was deficient, the amount being about half of the normal fall for September. The frosts that occurred during the month were generally light, and, except in favorable localities, not sufficiently heavy to stop vegetable growth or kill vegetation, except of the tender varieties.

Weather of October, 1902.

The weather of the month was devoid of conspicuous features in any of its several elements. There was an average amount of sunshine and pleasant weather, and also about the usual number of days on which rain fell. The rainfall was practically normal in amount and quite equably distributed through the month. General rains fell on the 1st, 6th, 12th and the 28th, and light showers on several occasions between those dates, which maintained a very seasonal condition of the soil. The temperature ranged above the average for nearly the whole of the month, although the excess was not marked at any time. At Boston the excess averaged about two degrees per day. The first general killing frost, one to reach all sections, occurred on the morning of the 22d, which is about the average date. Snow flakes were observed in the air, at Boston and its vicinity, on the 29th, which was the first of the season. While this was earlier than the usual or average for the "first snow," it has occurred as early in other years. The weather of the

month was well suited to the gathering and housing of crops and to outdoor work generally. Considered as a whole, the month will go on record as a very pleasant one.

Crops of the Year.

The season was considered in advance of the normal at the beginning of the month of April, but by the close was about normal in most sections. Pastures and mowings suffered from drought, and it looked doubtful whether, even with favorable weather, the hay crop could recover from the check. Fall seeding did not winter as well as usual. The fruit bloom was very heavy and the frosts of the month did little damage to fruit. Insects were doing but little damage. Spraying appeared to be barely holding its own among farmers. Wages averaged $20 per month with board and $1.50 per day without board. A considerable increase in the acreage of corn was noted, and a slight one in that of other grains and of potatoes.

Insects did but little damage in June, the cold weather perhaps operating to hold them in check. Indian corn was very small and backward, with, however, little complaint as to stand and color. Haying had hardly begun and a short crop was expected. The acreage of early potatoes showed a slight increase and the vines were looking extra well, though perhaps a little backward. Early market-garden crops had generally done well, with prices a little above the average. Dairy products appeared to be normal as to quantity, with a general increase in prices; dairy cows in good demand and at high prices. Pastures were generally looking well, although feed was still short in some cases. Strawberry picking was well under way, with the prospect of only a fair crop. Apples promised well, with Baldwins below other varieties; pears light; peaches above average; plums promised a good crop.

In July much less than the usual amount of damage from insects was reported. Indian corn was fully two weeks late and badly in need of warm growing weather. Silos continue to gain in favor. The excess of rainy weather made haying progress very slowly, but improved the crop in quan-

tity beyond what had seemed possible: quality generally good, but with much damage from rain. Rather more forage crops than usual had been planted and they were in excellent condition. Market-garden crops grew well, with prices better than usual. Very few potatoes were dug at the time of making returns, but the crop promised well, with prices well sustained. Apples promised a good crop though not a record one; pears light; peaches above the average; plums fair crop; grapes set heavily; cranberries set well. Pastures were never in better condition at the time of year. Rye, oats and barley generally promised well.

The cold nights of August retarded the corn crop still further and not more than a partial crop seemed a possibility. Rowen promised a heavy crop on early cut fields but not more than an average crop on all fields. Late potatoes were generally attacked by blight and rot, but where these did not appear yielded well. The acreage of tobacco was slightly increased and the crop was a fine one, though somewhat late. Apples promised a good crop, but Baldwins did not promise as well as other varieties; pears very light; peaches uneven, but not far from an average crop; grapes promised well; cranberries a light crop in south-eastern sections. Pastures were generally in excellent condition. Oats were an exceptionally good crop; barley not more than an average crop.

The frosts of the first week of September severely injured corn in many sections, and on the whole the crop was one of the poorest ever secured. Rowen was somewhat below an average crop, owing to late cutting of the first crop, and the dull weather was very unfavorable to securing it. Less than the usual amount of fall seeding had been done, but it was in good condition. Onions were less than an average crop, with prices very satisfactory. The yield of potatoes was shortened by rot, but not as much as had been feared. Root crops were generally in excellent condition. Celery was a good crop and other late market-garden crops were generally fair. Apples improved much during the month and a good crop was assured; pears very light; peaches above average in yield; grapes a heavy crop but not ripening well; cranberries a light crop.

In the circular to correspondents returnable to us October 23 the following questions were asked : —

1. What is the value of the corn crop compared with a normal crop?
2. Have root crops proved to be average crops?
3. What is the condition of farm stock?
4. What is the condition of fall seeding?
5. How have prices for crops raised for market compared with former years?
6. Which of the leading crops in your locality have been most profitable?
7. Which of the leading crops in your locality have been least profitable?
8. Considered as a whole, has the season been a profitable one for your farmers?

Returns were received from 147 correspondents, from which the following summary has been made : —

Value of the Corn Crop.

Corn was very backward throughout the season and in localities where early frosts occurred was almost a total failure, both for grain and stover. Elsewhere a partial crop of both was secured, but in all localities there were many fields which made very poor yields. The crop was better in eastern sections than in the western counties, but nowhere did it approach an average crop. Probably the value of the crop is not far from two-thirds of the normal, taking all parts of the State into consideration, and also considering the value of the grain and stover and of that portion of the crop raised for ensilage.

Root Crops.

Root crops have generally proved to be good average crops, the number reporting them to be below the average being fully balanced by those who speak of them as being extra good. Potatoes are a light crop as a whole, owing to rot, but very good prices have prevailed. Celery appears to be a very good crop.

Farm Stock.

Feed in pastures has been good throughout the season and still continues green in most sections. Farm stock is therefore almost invariably reported to be in good condition, and will go into the barns for the winter in prime flesh and the best of health.

Fall Seeding.

Less than the usual amount of seeding has been done, farm work being behind during September, and the frequent rains since then having made the fitting of the ground difficult. That which was put in early is in excellent condition, the frequent rains having been very beneficial. Late seeding made a good catch, but is of course somewhat backward for so late in the season.

Prices.

Of the 141 correspondents answering the question in regard to prices received for crops raised for market, 70 speak of them as average, 66 as higher than usual and 5 as lower than usual. The general trend of prices seems to have been upward, shortages in particular crops doubtless operating to increase the movement.

Most Profitable Crops.

There is the usual diversity of opinion among correspondents as to the crops which have proved most profitable, 62, less than a majority, uniting on potatoes; 41 consider hay to have been among the most profitable crops; 32, apples; 10, oats; 8, corn; 7, tobacco; 7, cranberries; 6, cabbages; 6, sweet corn; 6, strawberries; 4, onions; 4, tomatoes; 4, beans; 4, fruit; 3, peaches; 3, peas; 2, market-garden crops; 2, asparagus; 1, ruta-bagas; 1, forage crops; 1, celery; 1, milk; 1, plums; and 1, root crops.

Least Profitable Crops.

Sixty-four correspondents, an unusually large number to unite on any one crop as among the least profitable, speak of corn as among the least profitable crops; 27, potatoes;

9, hay; 7, tomatoes; 6, apples; 4, squashes; 4, cabbages; 4, sweet corn; 3 cranberries; 3, milk; 3 beans; 2, onions; 2, pears; 2, cucumbers; 1, asparagus; 1, grapes; 1, cauliflowers; 1, beets; 1, melons; 1, peas; 1, small fruits; and 1, market-garden crops.

Profits of the Season.

Judging from the returns the present season has not been an unprofitable one for our farmers as a whole, although perhaps not up to some recent years for profit. Corn and potatoes are the only principal crops to show a shortage, and in the case of the latter good prices somewhat compensate for the decreased yield. Good prices received for most crops together with quick sales have been factors making for profit. Of the 144 correspondents answering this question, 62 consider the season to have been profitable, 11 as above the average for profit, 16 as average for profit, and 18 as fairly profitable, while 37 think that it has not been a profitable one.

NOTES OF CORRESPONDENTS.

(Returned to us October 23.)

BERKSHIRE COUNTY.

Sheffield (Dwight Andrews). — The value of the corn crop is not one-half that of a normal crop. Root crops are full average crops. Farm stock is looking well. Fall seeding is looking well but is a bit late. Average prices have been received for crops raised for market. Hay has been our most profitable crop and potatoes and corn our least profitable ones. The season has been an average one for profit with our farmers.

New Marlborough (E. W. Rhoades). — The value of the corn crop is about one-half that of a normal crop. Root crops have proved to be average crops. Farm stock is in good condition. But little fall seeding has been done, but what has been put in is looking finely. Prices for crops raised for market have ruled about the same as in former years. Oats have been our most profitable crop and corn our least profitable one. Considered as a whole the season has been a profitable one for our farmers.

Becket (Wm. H. Snow). — Corn did not ripen the grain and is only valuable for its stover, and some of that is frosted. Root crops are up to the usual average. Farm stock is in very good condition. Fall seeding is in very good condition, also that put in last spring. Hay and oats have been our most profitable crops and corn and potatoes our least profitable ones. I think the season a profitable one, as all crops, and also milk and butter, have brought good prices.

West Stockbridge (J. S. Moore). — The corn crop is estimated to be one-fourth that of former years in value. Potatoes are a half crop; other roots average. Pasturage is good and stock in corresponding condition. Fall seeding is in very fair condition. Prices for farm crops have ruled much better than usual on account of short crops. Oats have been our most profitable crop and corn and potatoes our least profitable ones. The season has not been a profitable one for our farmers.

Peru (Frank G. Creamer). — The corn crop is about 25 per cent in value as compared with a normal crop. Root crops are up to the usual average. Farm stock is in fair condition. Not much fall seeding has been done. Prices for crops raised for market have compared well with former years. Hay has been our most profitable crop and corn our least profitable one. Considered as a whole the season has not been a profitable one for our farmers.

Dalton (Wesley B. Barton). — The value of the corn crop is not more than three-fifths that of a normal crop. Root crops are up to the usual average. Farm stock is in good condition. Fall seeding is in good condition. Prices have been good for crops raised for market, probably 20 per cent higher than usual. Market-garden crops have been our most profitable crops and potatoes our least profitable one. In this section the year has been a hard one for farmers.

Windsor (H. A. Ford). — Corn is not more than one-half a normal crop in value. Root crops have proved to be average crops. Farm stock is in good condition. Fall seeding is in fine condition. Potatoes have not brought as high prices as usual, prices for other crops about average. Oats and apples have been our most profitable crops and corn our least profitable one. The season has not been a very profitable one, having been too cold and wet.

Savoy (W. W. Burnett). — The corn crop is nearest a failure of any ever raised, being perhaps one-eighth or one-tenth in value of a normal crop. Root crops are about average so far as harvested. Farm stock is in very fair condition, fully average with former years. Fall seeding is in fine condition. Prices for crops raised for market have been a full average. Hay has been our most profitable crop and corn our least profitable one. The season has been about an average one for profit, as dairy products and poultry products have been in good demand at good prices. Some of our farmers had dry wood on hand which they have sold at good prices, many are now engaged in picking ferns, which has become quite a fall industry, and later some attention will be given to cutting Christmas trees for the city markets, all of which things help out.

Williamstown (S. A. Hickox). — Indian corn is 60 per cent of a normal crop in value. Root crops are up to the usual average. Farm stock is in good condition. Fall seeding is in good condition. Prices for crops raised for market have ranged a little lower than usual. Oats have been our most profitable crop and potatoes our least profitable one. Considered as a whole the season has not been a profitable one for our farmers.

FRANKLIN COUNTY.

Monroe (D. H. Sherman). — Corn is a total failure for grain, and the stover is not over 75 per cent of the normal in value. Root crops are not average crops. Farm stock is in fair condition. But very little fall seeding has been done. Prices for crops raised for market have been average. Hay has been our most profitable crop and corn and root crops our least profitable ones. Considered as a whole the season has been a medium one for profit.

Leyden (U. T. Darling). — Indian corn is not over 50 per cent of an average crop. Root crops are up to the usual average. Farm stock is in good condition. Fall seeding is in very good condition. Prices for crops raised for market have compared favorably with former years. Hay and potatoes have been our most profitable crops and corn our least profitable one. The apple crop is above the average and has brought good prices. Considered as a whole the season has not been a profitable one.

Ashfield (Chas. Howes). — Corn is not over half a crop. Root crops are very good. Farm stock is looking well. Fall seeding is in extra good condition. Apples are our most profitable crop and corn our least profitable one. The year is above an average one for profit with our farmers.

Whately (Frank Dickinson). — Indian corn is 75 per cent of a normal crop for profit. Root crops are up to the usual average. Farm stock is in good condition. Fall seeding is in good condition but is late. Prices have ruled higher than usual for crops raised for market. Tobacco has been our most profitable crop and corn our least profitable one. Considered as a whole the season has been a profitable one for our farmers.

Sunderland (J. M. J. Legate). — Corn is not one-fourth of a normal crop in value. Root crops have been above the average. Stock will come into the barns in fine condition. Fall seeding is in fine condition, there having been an extra supply of moisture. Prices have been somewhat above the average for crops raised for market. Tobacco will probably prove to be our most profitable crop, and corn is our least profitable one. The season has been a profitable one for most of our farmers.

Montague (C. S. Raymond). — Corn is not more than 75 per cent of a normal crop in value. Root crops are somewhat better than average crops. Farm stock is in very good condition. Early seeding is looking well, but late seeding is not so good. Prices have ranged about 10 per cent better than usual. Potatoes have been our most profitable crop and corn our least profitable one. Considered as a whole the season has been a profitable one.

New Salem (Daniel Ballard). — Indian corn is about three-fourths of a normal crop in value in this vicinity. Root crops have proved to be average crops. Farm stock is looking very well indeed. Fall seeding is looking finely. Prices have been good for crops raised for market. Hay and apples have been our most profitable crops and corn our least profitable one. I think the season will average fairly well as far as profit is concerned.

HAMPSHIRE COUNTY.

Prescott (W. F. Wendermuth). — The value of the corn crop is not above 60 per cent of a normal crop, as it did not ripen well and much of the stover was injured by early frost. Root crops are rather better than an average. Farm stock is in very good condition. Very little fall seeding has been done, but what was done is very good. The season has been about an average one for profit and perhaps better, as dairy products and poultry products have brought good prices. Apples, hay and forage crops have been our most profitable crops and potatoes our least profitable one.

Pelham (J. L. Brewer). — Corn is 80 per cent of a full crop in value. Root crops will be good crops. Farm stock is in fully as good condition as usual. Fall seeding appears well. Prices have ruled about average. Apples and potatoes have been our most profitable crops and corn our least profitable one. Winter squashes and melons are poor crops. Considered as a whole the season has been a profitable one.

Amherst (Wm. P. Brooks). — Corn is generally rather better than half a crop as to value. Root crops are above the usual average. Farm stock is in excellent condition. Fall seeding was never in better condition. Prices for crops raised for market have generally been a full average; onions high and tobacco above average. Tobacco, onions and potatoes have been our most profitable crops and corn our least profitable one. The season will prove above an average one for profit. Apples are a larger crop than was anticipated; fruit extra in size and quality.

Hadley (H. C. Russell). — Corn is not over 75 per cent in value of a normal crop. Root crops are about average. Farm stock is in good condition. Fall seeding is in good condition. Prices for crops raised for market have ruled fully as high as usual. Onions have been our most profitable crop and potatoes our least profitable one. On the whole the season has been as profitable as usual.

Southampton (C. B. Lyman). — Corn is about 65 per cent of a normal crop in value. Root crops are in good condition. Farm stock is looking well. Fall seeding is in very good condition.

Prices for crops raised for market are fully up to former years. Hay, tobacco and apples have been our most profitable crops and corn and potatoes our least profitable ones. Considered as a whole the season has been a fairly profitable one for our farmers.

Westhampton (H. A. Parsons). — Corn is not over half a crop in value of grain and not over a three-fourths crop in value of stover. Root crops have proved to be good crops. Farm stock is in good condition. Fall seeding is in good condition. Prices of crops raised for market have been good. Apples are our most profitable crop and corn our least profitable one. Considered as a whole the season has been a profitable one for our farmers.

Huntington (H. W. Stickney). — Corn is not more than half a normal crop in value. Root crops have done finely. Farm stock is looking finely. Fall seeding looks well, the wet weather having been favorable to it. The prices for crops raised for market are fully as high as usual. In this and neighboring towns apples are very plenty. Where the soil is light potatoes have been our most profitable crop.

Chesterfield (Horatio Bisbee). — The corn crop was nearly a failure in this section. Root crops have proved to be average crops. Farm stock is in good condition. Fall seeding is in good condition. Prices for farm crops have been fully up to the average. Apples have been our most profitable crop and corn our least profitable one. Considered as a whole the season has hardly been a profitable one for our farmers.

HAMPDEN COUNTY.

Tolland (E. M. Moore). — Corn is about two-thirds of a normal crop in value. Roots have proved to be about average crops. Farm stock is in good condition. But little fall seeding has been done. Apples are our most profitable crop and potatoes our least profitable one. The season has been as profitable as an average season, considered as a whole.

Russell (E. D. Parks). — The value of the corn crop is about normal. Root crops are not quite up to the average as a whole. Farm stock is looking well as a general rule. Fall seeding is in very good condition. Prices for crops raised for market have ruled about average. Hay has been our most profitable crop and potatoes our least profitable one. The season has been fairly profitable, but the cold and rain have made it not quite as profitable as a normal year.

Westfield (C. F. Fowler). — Corn is 20 per cent below the average for grain, and still more so for fodder. Roots are up to

the average and mangolds have done remarkably well. Pastures have been good and all stock is in fine condition. Early seeding is looking well, but late seeding needs more warm weather. Prices for nearly all market crops have been fairly remunerative. Hay, potatoes and corn are paying crops; tobacco is not yet sold, but from present prospects should be the leader for profit. The season may be called fairly profitable if you mean by that making both ends meet.

West Springfield (T. A. Rogers). — Corn is fully up to an average crop in quantity and value. Root crops are generally good. Milking stock looks well, but young stock is not coming in in good condition. Fall seeding never looked better. Prices for crops raised for market are fully up to the average, perhaps better. Tobacco, onions and hay have been our most profitable crops and milk our least profitable product. The season has not been a profitable one, and there has been so much rain that it has been hard to advance farm work.

East Longmeadow (J. L. Davis). — Indian corn is not over 60 per cent of a full crop in value. Root crops are up to the usual average. Farm stock is in good condition. Fall seeding is in good condition. Prices for crops raised for market have ruled about the same as usual, although sales and collections have been quicker. Hay has been our most profitable crop and potatoes our least profitable one. Prices are too low and wages too high to make farming pay if figured on a strictly business basis.

Wilbraham (H. M. Bliss). — Corn is about two-thirds of a normal crop in value. Root crops are about three-fourths crops. Farm stock is in good condition. Fall seeding is in fair condition. Prices have been full average for crops raised for market. Hay, apples and peaches have been our most profitable crops and potatoes and corn our least profitable ones. Considered as a whole the season has been a fairly profitable one for our farmers.

Monson (F. D. Rogers). — Corn is about 60 per cent of a normal crop in value. Root crops are up to the usual average. Young stock is very good, but milch cows are thinner than usual. Fall seeding is in good condition. Prices for farm crops have ruled rather higher than usual, and dairy and poultry products especially so. Grass has been our most profitable crop and corn our least profitable one. Considered as a whole the season has been a profitable one for our farmers.

WORCESTER COUNTY.

Warren (W. E. Patrick). — The corn crop is about two-thirds of a normal crop in value. Root crops have proved rather above the average crops. Farm stock is in remarkably good condition. Fall seeding is in first class condition. Grass, potatoes and apples are our most profitable crops and corn our least profitable one. As a whole the season has been the most profitable one for several years.

Spencer (H. H. Kingsbury). — Considering its immaturity the corn crop is not above 50 per cent of the value of a normal crop. The season has been favorable to all kinds of root crops. Farm stock is looking healthy and thrifty. There seems to be but little variation in the prices of market crops from those received in years past. Hay has been our most profitable crop and corn our least profitable one. The high price of grain has decreased the profit on milk production, but the season has been a normal one for profit.

New Braintree (C. D. Sage). — Indian corn is about 75 per cent of a full crop in value. Very few root crops are grown, but they have done well. Farm stock is generally in fine condition. Very little fall seeding has been done. Prices for crops raised for market have made a fair average. Grass, oats and apples are our most profitable crops. Considered as a whole the season has been a profitable one for our farmers.

Oakham (Jesse Allen). — Corn is about two-thirds of a normal crop in value. Root crops are good crops. Farm stock is in very good condition. Fall seeding looks well. Prices on most crops have ruled a little higher than usual. Milk has been our most profitable product and corn our least profitable crop. Considered as a whole the season has been an average one for profit. Apples are very abundant and of excellent quality.

Hubbardston (C. C. Colby). — The corn crop is about 60 per cent of a normal crop in value. All root crops have made good growth, especially potatoes. Farm stock is coming to the stable in excellent condition. Fall seeding is in good condition. Potatoes have made a heavy growth and will prove a paying crop. Corn was very backward and many fields were ruined by the early frosts. The only reason why this will not prove an uncommonly profitable season for our farmers is the high price of grain.

Petersham (S. B. Cook). — Indian corn is 60 per cent of a normal crop in value. Root crops are more than average crops. Stock is in fine condition. Fall seeding is looking well. Prices for crops raised for market are about the same as usual. Apples, potatoes and hay have been our most profitable crop and corn our

least profitable one. The season has been especially favorable for making milk and the growth of stock, and will be a profitable one.

Templeton (Lucien Gove). — Corn is less than half a normal crop in value, being small in growth and with hardly any sound corn. Turnips and beets are good crops; other roots rather light. Farm stock is in better condition than usual, feed holding good throughout the season. Fall seed is in quite good condition. Hay, cabbages, potatoes and apples have been our most profitable crops and corn, tomatoes, squashes and beans our least profitable ones. Considered as a whole the season has been a reasonably profitable one, for while some crops have been nearly a failure others have given more than normal yields.

Westminster (A. J. Foskett). — Indian corn is about one-eighth of a normal crop in value. Root crops are fully up to the usual average. Farm stock is in excellent condition. Fall seeding is in remarkably good condition. Prices of crops raised for market have been very favorable. Potatoes are our most profitable crop and corn our least profitable one. Considered as a whole the season has been a profitable one for our farmers.

Bolton (H. F. Haynes). — Indian corn is 25 per cent of a normal crop in value. Root crops have proved to be average crops. Farm stock is in good condition. Fall seeding is in very good condition. Prices for crops raised for market have been full average prices. Potatoes have been our most profitable crop and corn our least profitable one. The season has been a very poor one for our farmers as a whole, as most crops have been far below the normal in yield.

Holden (G. S. Graham). — As grain, corn will not show over 50 per cent of the normal value of the crop. Root crops are generally good. Farm stock is healthy and in average condition. Fall seeding looks well though late. Prices have perhaps ranged a little higher than in some former years. Potatoes and cabbages have been our most profitable crops and corn our least profitable one. There have been some drawbacks to the season, but on the whole the farmer should not complain.

Oxford (D. M. Howe). — Corn is a good crop, but quite a good deal of the fodder will be poor owing to early frost. Root crops have proved to be average crops. Farm stock is in good condition. Fall seeding is as good as usual. Prices for crops raised for market have ranged fully up to the average. Apples and potatoes have been our most profitable crops and cranberries and tomatoes our least profitable ones. Considered as a whole the season has been a profitable one for our farmers.

Sutton (W. J. King). — Corn is not as good a crop as in former years. Root crops are proving to be average crops. Farm stock

is in good condition. Fall seeding is in good condition. Prices for crops raised for market have ruled higher than in former years. Oats and potatoes have been our most profitable crops and corn our least profitable one. Considered as a whole the season has not been a profitable one for our farmers.

MIDDLESEX COUNTY.

Marlborough (E. D. Howe). — The value of the corn crop is 80 per cent of that of a normal crop. Root crops have proved to be average crops. Farm stock is in fair condition, less grain than usual being fed on account of high prices. Fall seeding is in first class condition. Prices for some crops have ranged higher than usual and for other crops lower than usual. Our leading product is milk and there is very little profit in it at present prices, so the season has been only moderately profitable.

Westford (J. W. Fletcher). — Indian corn is below the average in value of crop. Root crops have proved to be average crops. Farm stock is in good condition. Not much fall seeding is done in this section. Prices for crops raised for market have ranged about the same as usual. Fruit has been our most profitable product. I should say that the season has been a profitable one for our farmers.

Townsend (G. A. Wilder). — Indian corn is 50 per cent below the normal in value of crop. Root crops are up to the usual average. Farm stock is in good condition. Fall seeding is in normal condition. Prices for crops raised for market have ranged 25 per cent above the normal. Apples, peaches and potatoes have been our most profitable crops, and corn, cranberries, grapes and pears our least profitable ones. Considered as a whole the season has been a profitable one for our farmers.

Pepperell (P. J. Kemp). — Corn is generally about 80 per cent of a normal crop in value. Root crops are more than average crops. Farm stock is in good condition, and fall feed has been better than usual. Most seeding was late because of rain, but is looking well. Prices for crops raised for market are rather higher than in former years. Grass has been our most profitable crop and potatoes our least profitable one. As a whole the season has been against the farmer, a late spring ruining the hay crop, and potatoes rotting and apples rusting.

Tewksbury (G. E. Crosby). — Indian corn is 50 per cent of a normal crop in value. Root crops are nearly up to the usual average. Farm stock is in good condition. Fall seeding is in good condition. Prices for crops raised for market have ranged from

10 to 25 per cent higher than usual. Sweet corn has been our most profitable crop, and tomatoes and cabbages our least profitable ones. With a fair crop of apples to help out, the season will probably be profitable as a whole.

Carlisle (E. J. Carr). — The corn crop is better than a normal crop. Root crops, including potatoes, are above the average. Farm stock is in fair condition, but there has been too much wet weather for it to fatten. Fall seeding is in good condition. Prices for crops raised for market have ruled above the average. Corn and potatoes have been our most profitable crops and beans our least profitable one. Our farmers have raised good crops and received good prices for them.

Concord (Wm. H. Hunt). — Corn is a little below an average crop in profit. Root crops are up to the usual average. Farm stock is in good condition. Fall seeding is in very good condition. Prices for crops raised for market have been above the average. Sweet corn, asparagus, tomatoes and beans have been our most profitable crops. Considered as a whole the season has been a profitable one for our farmers.

Lincoln (C. S. Wheeler). — The corn crop is about two-thirds of a normal crop in value. Potatoes are above the average, other root crops below. Farm stock is in better than average condition. Fall seeding is in fair condition. Prices for crops raised for market have been above the average. Strawberries and tomatoes have been our most profitable crops and sweet corn our least profitable one. Considered as a whole the season has been a profitable one for our farmers.

Lexington (F. L. Piper). — In this locality corn is a very good crop. Root crops have proved to be average crops. Farm stock is in good condition. Fall seeding is in very good condition. Prices for crops raised for market have been better than usual. Considered as a whole the season has been a profitable one for our farmers.

Winchester (S. S. Symmes). — Root crops have proved to be unusually good crops. Farm stock is in A1 condition. Fall seeding is in very good condition. Prices have not averaged higher than usual. Early sweet corn and tomatoes have been our most profitable crops and cauliflower, early celery and early cabbage our least profitable ones. There is a small margin of profit this season. It is a little singular that while manure is much cheaper than it was some years ago it is nevertheless harder to make profits on our crops. There is much keener competition and so much of produce sent to market as to make small margins.

ESSEX COUNTY.

Haverhill (Eben Webster). — Indian corn is about two-thirds of a normal crop in value. Root crops have proved to be average crops. Farm stock is looking well. Fall seeding is in good condition. Prices for crops raised for market have been higher than usual. The apple crop has been fair and prices good this season. The season has been a fairly good one for profit.

Newbury (G. W. Adams). — Corn is about 75 per cent of a full crop, but is above the average in value owing to high prices. Root crops have proved to be average crops. Farm stock is in very fair condition. Fall seeding is backward. Prices for crops raised for market have ranged about average. Hay and strawberries have been our most profitable crops, and pears our least profitable one. The season has hardly been a profitable one, as the cost of labor and scarcity of help has taken away all profits.

Andover (M. H. Gould). — Ensilage corn was a good crop, but corn for grain was far below the normal. Root crops are up to the usual average. Farm stock is in good condition. Fall seeding is in good condition. Prices for crops raised for market have been a little above the average. Strawberries have been our most profitable crop and cucumbers our least profitable one. The season has been a better one than many seasons for profit.

Wenham (N. P. Perkins). — Root crops are good average crops, but are rather late. Stock as a rule is in fair condition, but milch cows are not doing as well as they should. Fall seeding has come up quite well, but as a rule is rather backward. Prices for crops vary, some good, others quite low. Potatoes, onions, hay, sweet corn and apples are our most profitable crops, and potatoes, beets, peas, milk and small fruits our least profitable ones. It is too early yet to tell what the profits of the season will be, as most of our crops are not yet sold.

Manchester (John Baker). — Indian corn is a little above a normal crop in value. Root crops are above the average. Farm stock is in good condition. Fall seeding is in good condition. Prices for crops raised for market are better than in former years. Strawberries, corn, potatoes, peaches, plums and cabbages have been our most profitable crops; nearly all market-garden crops have been profitable. Considered as a whole the season has been a profitable one for our farmers.

NORFOLK COUNTY.

Randolph (R. A. Thayer). — Indian corn is about two-thirds of a normal crop in value. Root crops are good average crops. Pastures are good and stock in fine condition. Fall seeding is in good average condition. Prices for crops raised for market have been better than in average years. Apples and early potatoes are our most profitable crops and squashes and cucumbers for pickling our least profitable ones. All crops raised for market have yielded well and brought good prices, so the season has been a profitable one.

Norwood (F. A. Fales). — Indian corn is about 75 per cent of a normal crop in value. Root crops are not average crops. Farm stock is in good condition. Fall seeding is in fair condition. Prices for crops raised for market have ranged 20 per cent higher than in former years. Corn and potatoes have been our most profitable crops and cabbages our least profitable one. Considered as a whole the season has been a profitable one for our farmers.

Walpole (E. L. Shepard). — The value of the corn crop is about half that of a normal crop. Root crops are not up to the usual average. Farm stock is in very good condition. Fall seeding is in average condition. Prices for crops raised for market have been higher than in former years. Potatoes have been our most profitable crop and corn our least profitable one. The season has not been a profitable one, as farm products have sold low in proportion to the price of grain and other commodities which farmers must buy.

Millis (E. F. Richardson). — Corn is less than an average crop in value. Root crops are up to the usual average. Farm stock is in good condition. Fall seeding is in good condition. The prices for farm crops are better than average. Hay and fruit have been our most profitable crops and potatoes our least profitable one. Considered as a whole the season has been a profitable one for our farmers.

Franklin (C. M. Allen). — The value of the corn crop is about three-fourths that of a normal crop. Root crops have proved to be average crops. Farm stock is in better than average condition. Most fall seeding looks well. More than average prices have prevailed for crops raised for market. Potatoes and apples have been our most profitable crops and hay and corn our least profitable ones. There is not much profit on the farm, but this year is better than usual.

BRISTOL COUNTY.

Mansfield (Wm. C. Winter). — The value of the corn crop is about normal. Roots will generally be about average crops. Farm stock is in excellent condition. What little fall seeding is done is in good condition. Prices for farm crops have been about as usual. Hay has been our most profitable crop because of its necessity in dairy operations and apples our least profitable one, having been practically unsalable. All things considered the season has been about an average one for profit.

Attleborough (Isaac Alger). — Indian corn is 15 per cent above the normal in value. Root crops are up to the usual average. Farm stock is in very good condition, above the average. Fall seeding is in good condition. The prices for crops raised for market are somewhat higher than usual. Potatoes have been our most profitable crop. The season has been a fairly good one for profit, all crops having yielded well except cranberries, which are much below the average.

Norton (Wm. A. Lane). — The corn crop is a normal crop this year. Root crops have proved to be average crops. Stock is in good condition. Fall seeding is looking well. The prices of crops raised for market are about one-seventh higher than in former years. Potatoes have been our most profitable crop and corn our least profitable one. This has been a poor season for farmers.

Berkley (R. H. Babbitt.) — Corn is below the average in quantity, but the high price will bring the value of the crop up to the average. Root crops are good crops. Farm stock is in very good condition. Fall seeding has done finely. Prices for crops raised for market have been better than the average. Strawberries and sweet corn have been our most profitable crops and potatoes our least profitable one. The season has been better than an average year considered as a whole.

Westport (A. S. Sherman). — The corn crop is of greater value than any other crop except hay. Root crops are up to the usual average. Farm stock is in good condition. Fall seeding was never in better condition. Prices for crops raised for market have been up to former years and in some cases better. Hay has been our most profitable crop and potatoes our least profitable one. Considered as a whole the season has been a profitable one for our farmers.

PLYMOUTH COUNTY.

Brockton (Davis Copeland). The corn crop is about 80 per cent of a normal crop in value. Root crops have proved to be

average crops. Farm stock is in good condition. Fall seeding is in good condition. Prices have been rather low for crops raised for market. Potatoes have been our most profitable crop and corn our least profitable one. Considered as a whole it is doubtful if the season has been a profitable one to our farmers.

Marshfield (J. H. Bourne). — Indian corn is within 10 per cent of a normal crop in value. Root crops are up to the usual average. Farm stock is in fully average condition. Fall seeding is in better shape than usual. Prices for crops raised for market have been fully up to former years. Potatoes have been our most profitable crop and hay our least profitable one. The cranberry crop has been gathered without injury from frost and with well-ripened berries, but the crop was small on most bogs. Considered as a whole the season has been a profitable one.

Halifax (G. W. Hayward). — Corn is about two-thirds of a normal crop in value. Root crops are full average crops. Farm stock is in good condition. All early sown fall seeding is in fair condition. Prices have ruled about average for crops raised for market. Potatoes have been our most profitable crop and corn our least profitable one. As a whole the season has been a profitable one.

Kingston (G. L. Churchill). — The corn crop is a very fair one in value. Root crops are up to the usual average. Farm stock is in very fair condition. Prices have been very good for farm crops. Potatoes have been our most profitable crop and corn our least profitable one. The season has been a very profitable one for all farmers.

Carver (J. A. Vaughan). — Indian corn is an average crop in value. Root crops are above average crops. Farm stock is in good condition. Fall seeding is in good condition. Potatoes have been our most profitable crop. Cranberries are our leading crop, and the yield is not over half a normal crop, but the demand is good and the price advancing. Considered as a whole the season has been a profitable one for our farmers.

BARNSTABLE COUNTY.

Sandwich (R. F. Armstrong). — The corn crop is below the average, but how much it is impossible to tell at the present time. Farm stock is in good condition and the fall rains have improved pastures. Fall seeding is in fair condition. Prices have been quite satisfactory on most market crops. Cranberries have been our most profitable crop. I do not think the season could be called a very profitable one for the farmer in this locality.

Barnstable (John Bursley). — Indian corn is 90 per cent of a normal crop in value. Root crops are up to the usual average. Farm stock is in good condition. Fall seeding is in fair condition but late. Prices have ruled 10 per cent higher than average. Cranberries have been our most profitable crop and hay our least profitable one. Considered as a whole the season has been a profitable one for our farmers. White grubs are doing much damage in many pastures and mowings.

Dennis (Joshua Crowell). — Corn is about two-thirds of a normal crop in value. Root crops are up to the usual average. Farm stock is in good condition. Fall seeding is late but is all right. Prices for farm crops have perhaps ruled a little better than the average. Cranberries have been our most profitable crop and corn probably our least profitable one. The season has hardly been as profitable as the average, the profits being rather unevenly distributed.

Wellfleet (E. S. Jacobs). — The late spring and dull season have damaged corn to some extent. Root crops are not as good as usual, especially turnips. Farm stock is in good condition. Fall seeding looks well. Prices have ranged high and crops have found a ready market. Potatoes have been our most profitable crop, and tomatoes, squashes and apples our least profitable ones. Considered as a whole the season has been a profitable one, especially for market gardeners.

DUKES COUNTY.

West Tisbury (Geo. Hunt Luce). — Considering the present price the corn crop is nearly a normal one in value. Root crops are up to the usual average. Farm stock is in very good condition. Prices for crops raised for market have been above the average. Potatoes have been our most profitable crop and hay our least profitable one. Considered as a whole the season has not been far from an average one for profit.

NANTUCKET COUNTY.

Nantucket (Wallace Gardner). — The value of the corn crop is about 80 per cent of that of a normal crop. Root crops are better than average crops. Farm stock is in good condition. Fall seeding is in very good condition. Prices for crops raised for market have ranged about the same as usual. Potatoes, corn and oats have been our most profitable crops. In this section whatever is raised for market brings a good profit, and although crops have not done as well as usual it has been a good season taking everything into consideration.

BULLETIN OF
MASSACHUSETTS BOARD OF AGRICULTURE.

GREENHOUSE CONSTRUCTION AND MANAGEMENT.

By Prof. S. T. Maynard, *formerly professor of horticulture at the Massachusetts Agricultural College.*

The increased demand for vegetables out of their natural season and cut flowers during the winter months has resulted in the building of glass structures for their growth in almost every city and large town in New England. Vegetable growing under glass and growing cut flowers are industries that can well be carried on in connection with many other lines of agriculture and horticulture, as they furnish employment during the winter months, when there is little that can be profitably done out of doors, and in many country towns we find examples of successful and profitable enterprises in growing lettuce, cucumbers, tomatoes, carnations, roses, etc.

At first thought it seems as if this success came to the young men who undertake such enterprises without much effort, and at the first trial, but when we investigate more fully we find many failures before success crowned their efforts, and we learn that the details of the business can only be mastered so as to insure success in the same way as is required in any other kind of business, *i.e.*, by continued practice. Many failures are often made before one succeeds, and yet any young man or woman with a love for plants and flowers who will make a careful study of the work as it is conducted by the successful greenhouse men, of whom there are so many examples in Massachusetts, with a little capital and a determination to succeed, will have no serious difficulty in mastering the business in two or three years. They will find, however, that they will be able to learn something each year if they continue in the business, even for a life time.

For success, some of the conditions that must be provided are as follows: —

Location. — Glass houses should be located where the greatest amount of sunshine shall be obtained during the months of De-

cember and January, and be as much sheltered from the north and north-west winds as possible.

Drainage. — It is very important that the most perfect drainage be obtained; that there be no standing water in any part of the house or near the surface of the ground inside; that water used or coming into the house shall drain away quickly. Surface drainage should be provided by surface and under-drains about the building, so that during heavy rain storms the surface water shall run away from the building and not toward or into it.

Water. — Water supply, with a head of at least forty feet, is a necessity for the best results. This should come from cisterns or reservoir and not from wells.

Construction.

Greenhouses can often be built in the country cheaper than in the city, as materials like lumber, stone, etc., can often be obtained at a less cost than in the city, and if the owner is at all skilled in the use of wood-working tools he can do much of the work upon the common greenhouse structure.

Kinds of Greenhouses.

The form of greenhouse to be built must depend somewhat upon the location and the kind of crop to be grown, though the modern greenhouses of all forms are so constructed, with light sash bars and large glass, as to provide ample light, and success with any of them depends more upon the amount of heat supplied and the skill of the grower than anything else. Most of the modern houses for all kinds of crops under glass are lean-to or three-quarters span houses, facing the south, south-east or south-west, though some very good even span rose houses are built that give very good results.

The simplest structure that would have much value for commercial purposes is the lean-to house (Fig. 1). This may be attached to the south side of a stable or dwelling-house, and being sheltered from the north, requires only comparatively little heat, but, on the other hand, cannot be as well ventilated as a house exposed on all sides.

The three-quarters span house (Fig. 2) facing the south is the one most used by commercial florists and market-gardeners. It possesses the advantage of being cheap in construction, affording the greatest amount of sunshine and may be ventilated from all sides when necessary, for growing crops require low temperature and an abundance of light.

The foundation of these houses may be of stone or cement or

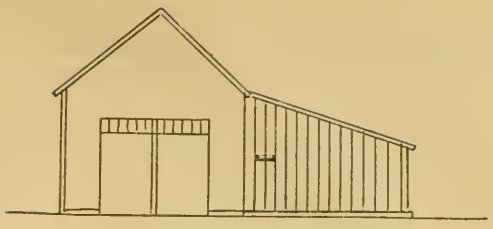


FIG. 1

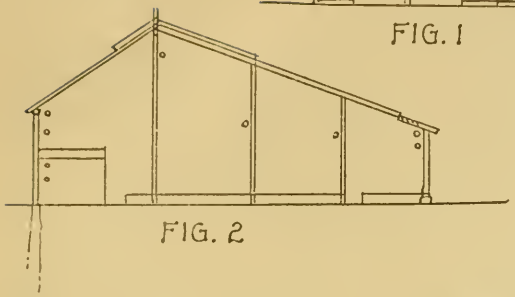


FIG. 2

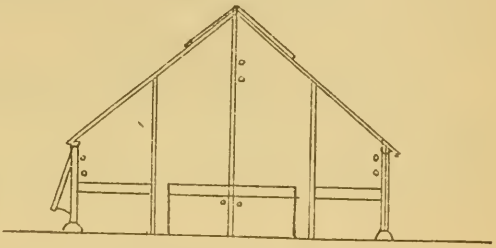


FIG. 3

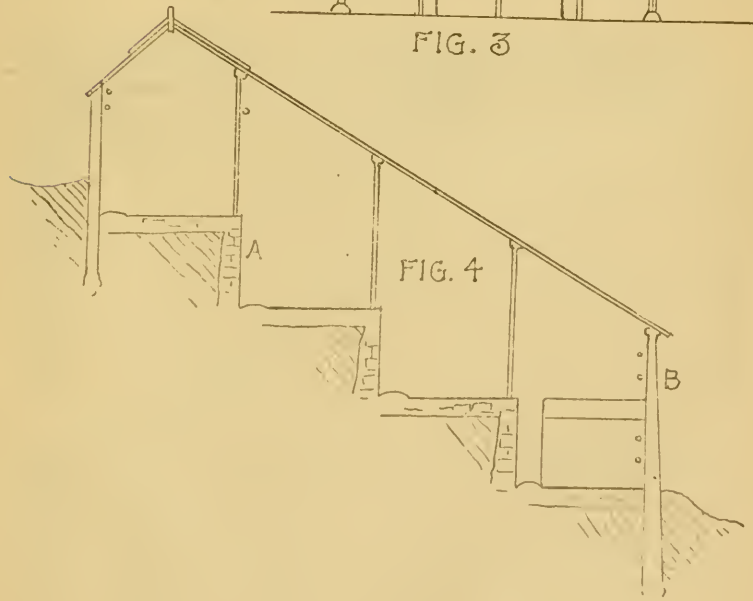


FIG. 4

the walls may be built upon chestnut posts set deep in the ground, or cast-iron posts made for this purpose. The north wall is made of non-conducting material, while the south wall is of glass.

The even span house (Fig. 3) is generally placed north and south, and has the advantage of exposing the plants to sunlight upon all sides, and receiving the greatest amount of sun's heat and light in the morning and afternoon. This is much used for the growth of roses, chrysanthemums, etc.

The side hill house (Fig. 4) possesses some advantages over those already mentioned. When built on a south, south-east or south-west slope they are perfectly protected on the north, and susceptible of perfect drainage, no matter what the nature of the soil. The cost of the side walls and the terrace walls (Fig. 4, *a*) is much less than that of outside walls and beds or benches in the other forms of houses. It is practically a *one*-roofed house with no gutters. One objection to this form may be found in the effort required in going up and down from one part of the house to the other.

Materials.

The best wood for greenhouses is cypress or clear heart white pine, the former being generally considered the best because of its straight grain and the great length, but it is more liable to warp out of place unless firmly nailed when put in place.

Foundation.

A good foundation must be provided or a house will often settle out of shape, and such light structures are easily ruined by this settling. Stone, concrete, brick, iron and wood may be used for foundations. Stone foundations should be put in below the reach of frost, and be well laid in mortar containing one-fifth Portland cement. Concrete can be made by digging a trench from eight inches to one foot wide and tamping in a rather dry mixture of Portland cement, one part to five of sand and small stone. The parts above the surface must be held in place by planks and be put in moist enough to be poured in from a pail. When nearly set a skim coat of cement and sand, one to three parts, may be added, used to dress up the surface. If good cement is used and is properly mixed a permanent and neat foundation wall can be made.

Stone foundations are more generally used with brick to top them out with, but to be satisfactory the brick must be laid in cement mortar. Many good houses are built by sinking chestnut or cedar posts three and one-half or four feet below the surface and standing above the surface high enough to form the walls upon. The north walls of the three-quarter span house may be

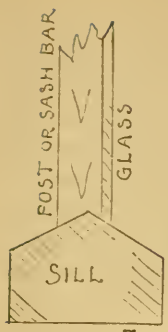


FIG. 5

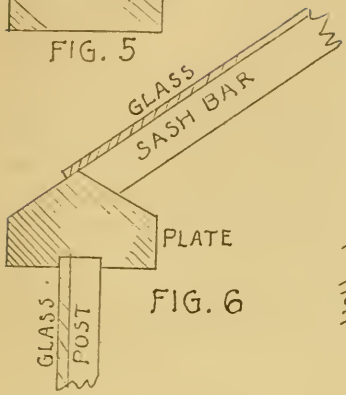


FIG. 6

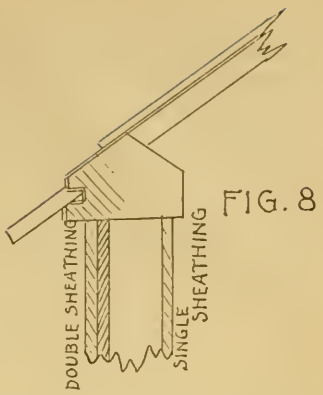


FIG. 8

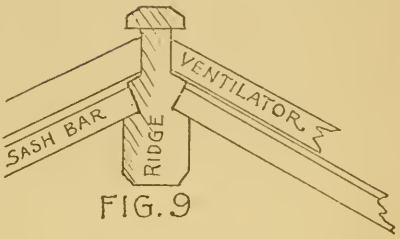


FIG. 9

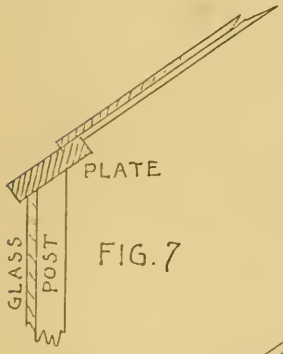


FIG. 7

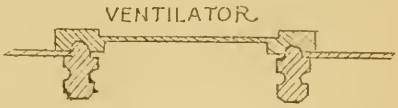


FIG. 10

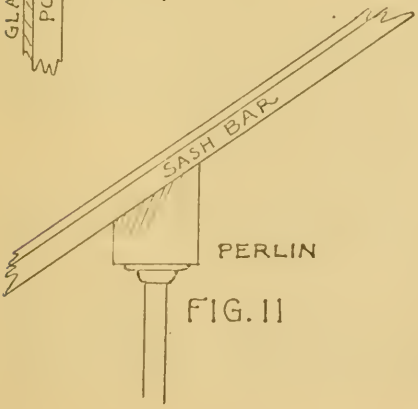


FIG. 11

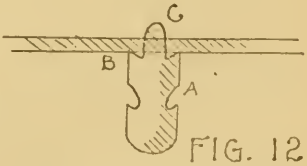


FIG. 12

thus formed by having the posts stand five to six feet out of the ground, while the front walls may be three to five feet high, according to the use for which the house is designed. All the posts should be faced on both sides from the point where they come out of the ground to an even thickness at the top (Fig. 4 *b*) so that the wall may be the same thickness. Cast-iron posts are used in many modern houses, being sunk below the surface as deeply as wooden posts and the main framework bolted to them. These are most largely used when the main rafters and perlins are also of iron.

Superstructure.

Sills. — These should be of cypress or chestnut, the first being preferred, but in case of a home supply of the latter it will be the much cheaper material and nearly as good. In form the upper side should be sloped so that the water will run off quickly, as in Fig. 5, as with water standing continually on the surface they will rot out very quickly, no matter what the material may be.

Posts. — The modern glass structures for growing plants are made of such light material that few posts, except those for the corner, the door posts and ventilator frames, are used, the main part of the structure being supported by light gas pipe three-quarters to one and one-half inches in diameter, as in Figs. 2, 3 and 4. In some cases, iron frames are used when the structure is very light, consisting only of the frame and gas-pipe supports, the sash bars and other woodwork resting as a shell upon the iron supports.

Sash Bars. — The form of sash bars most in use is shown in Fig. 12, having drip gutters at *a*, to catch the drip as it runs down the glass and carry it to the plates and walls of the house. Upright sash bars should be made without this drip gutter. These are supported by perlins (Fig. 11), which in turn are supported by gas pipe or light lumber.

Perlins. — In many cases angle iron is used as perlins, which is much more expensive but more durable.

The Ridge (Fig. 9) may be a plain board six to eight inches wide, or, better, one formed out of two-inch lumber with a groove cut for the support of the sash bars and ventilators.

Plates (Figs. 6 and 7) are made in many forms, but, as with the sills, should always have a sloping top to carry away the water quickly. Fig. 7 represents a very good plate, consisting of a two-inch plank eight to ten inches wide, spiked on the top of the posts or frame, the sash bars being fastened to the upper edge. To avoid shade from the plate on the south side of the house some houses are built by having the upright sash bars meet those of the roof and wall, the upper range of glass shutting over the lower so

that the water will run away from the front wall. When iron frames are used the front wall may be out of perpendicular from four to six inches to aid in this discharge of the drip. Another means of carrying the drip away from the front wall is obtained by inserting into the plate of ordinary form a "drip board" six to eight inches wide, as in Fig. 8.

Ventilators. — These should be placed about the houses in such a way as to give the proper amount of air for the crop grown, and be used for this purpose alone, and not to regulate the temperature. The skilful fireman will so regulate his fires as to require but little movement of the ventilator to keep up the even degree of heat required.

For forcing roses and other plants requiring a high temperature, and that are easily injured by a draught of cold air, the ventilators should be placed only on the south side, and be hinged so as to open at the top, that the cold air may enter at the highest point and become warmed before it comes in contact with the tender plants. For growing plants that succeed at a low temperature, and that require much air, ventilators are often placed on both sides of the roof, at the front and sometimes on the back walls. One advantage of having ventilators on all sides of the house is that by opening all a very short distance a large amount of fresh air may be admitted without causing a chill; but, on the other hand, the more ventilators used in the construction of the house the greater the cost. Side ventilators are difficult to construct and operate, as they must shut into a frame in order to make a close joint, and continued moisture during the summer and freezing weather in the winter cause them to open with difficulty, and they are soon wrenched and twisted out of shape. Ventilators on the roof are now constructed with a groove on the under side, which shuts down upon the tongue of the sash bar, as in Fig. 10, thus making a close joint and yet opening easily in all weathers. All sash fittings, like hinges, etc., should be put on with brass screws, as iron screws rust very quickly and soon rot out the wood through which they are driven.

Painting.

In building greenhouses all the framework should be painted with a priming coat of thin lead and oil paint before being fitted, and then all joints covered with thick white lead and oil paint before they are nailed together. In fitting the frame all joints are nailed together with fine wire nails. A frame thus put together will last as long if well painted as where the parts are mortised together, and the cost is much greater in the latter case.

Glass.

The glass most largely used in the construction of greenhouses is No. 2, or selected, double thick, for roof and southern walls, while No. 3, double thick, may be used for north walls, partitions, etc. The sizes used vary very much, but with the growing tendency to increase the size. That most used is 16 x 24 to 20 x 30.

Glazing.

All glass is put upon the sash bars bedded in soft putty that shall allow the glass to press down upon the sash bars, filling up every possible space with the least possible amount of putty. Putty containing one-fourth to one-third white lead is, perhaps, the best. All glass must be solidly fastened in with large zinc points, small brads or other nails made for the special purpose. The glass may be lapped from one-tenth to one-eighth of an inch or it may be fitted together with or without the zinc strip. If fitted without the zinc strip, glass should be square, and the lowest edge of each light be thicker than the upper, as in Fig. 13, that the water may run readily down the roof and not run into the house. The use of the zinc strip (Fig. 14) makes a very close, warm house, but with one with a low pitch of roof some water will work under, and the condensed moisture on the inside will drip more than when the glass is lapped or simply fitted together. The frame should be thoroughly painted before the glass is set, again after the glazing is done, and every second or third year, if it is desired to preserve it the greatest length of time.

Heating Greenhouses.

This is by far the greatest problem in greenhouse construction and there are many varying ideas in regard to it. The one thing that must be secured is an abundance of heat for the crop grown in the coldest weather, for nothing checks plants that are growing rapidly so quickly as to have them chilled, — and even plants that naturally grow at a low temperature may be seriously injured if suddenly chilled after a period of very rapid growth at a high temperature.

Steam and hot water are about equally used in greenhouse heating, the former being perhaps more largely used in heating large plants while hot water is more used for small houses. The main advantage of steam is that high heat can be gotten up more quickly with it than with hot water, and much less heating surface of pipe is required than with hot water, thus making the first cost of steam equipment a little less than that of hot water. The advantages of

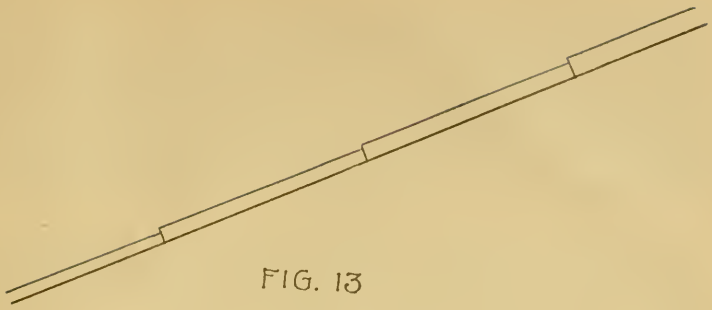


FIG. 13

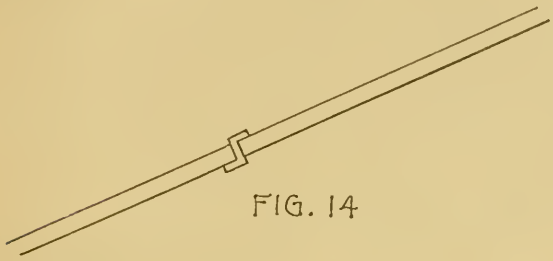


FIG. 14

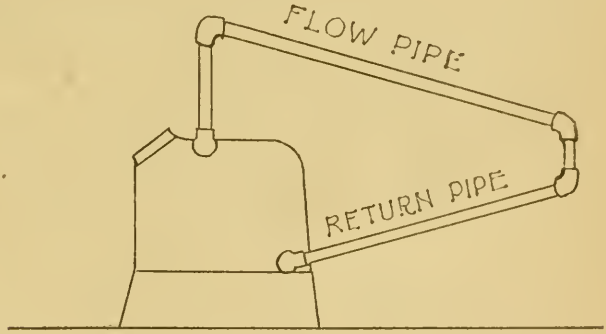


FIG. 15

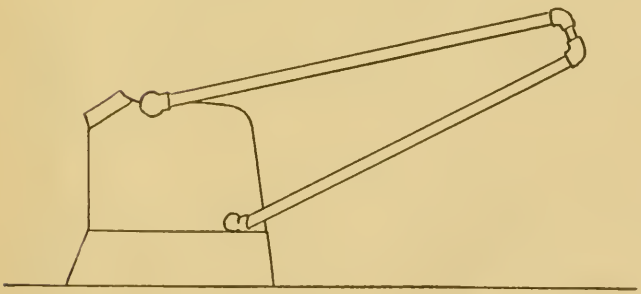


FIG. 16

hot water are that a small amount of heat may be produced during the fall or spring of the year, and heat will be secured more cheaply. With the modern method of using small pipes for distribution and radiation, both steam and hot water heat can be distributed with equal rapidity after the fire is started, but perhaps steam may be carried a greater distance than hot water unless it be under pressure.

Boilers.

The number of different kinds of both steam and hot water boilers that are now in use is very great, and many of them have reached great perfection, but it is difficult to prove that any one of the best of these is better than the others, and one must visit some of the most successful houses and learn what are considered the best.

A boiler to be satisfactory must have large grate area, large heating surface in contact with the fire and as much water surface as is possible directly over the fire, as it is here that the heat is the greatest and the water will be moved the most rapidly.

Most of the modern boilers are made in sections, so that the size may be varied by the number of sections used, and if one section breaks it can be replaced by a new one at but little cost. Cast iron is largely used for greenhouse heaters, both for steam and hot water, though for large plants the tubular boiler may be the most economical for generating steam.

When the establishment is large enough to warrant a night watchman soft coal is used at a great saving in the cost of heating.

Cleaning of Boilers. — A boiler that cannot be thoroughly cleaned out, and that easily, is a very expensive one to run, as when the heating surface becomes covered with soot and ashes little or no heat can pass through this non-conducting mass. With the best boilers we find openings in proper places so that brushes may be passed over all the surface of the sections, and if cleaning is done frequently a boiler will always be in the condition it was when first put in, and most boilers work well at the first trial.

Location of Boilers. — The cellar or pit is the favorite place for locating the boilers and it has the advantages of economy of space, and the flow pipes can be carried so high, even in a low house, as to give the best possible circulation, but few cellars or pits are dry enough to prevent the parts of the furnace from rusting, many of them are difficult to drain, or surface water sometimes runs in so as to cause much inconvenience. The modern greenhouses are so constructed that most of them can be heated by boilers standing on a level with their floors, and with proper care a boiler thus located in a shed or out-building will last many years longer than if put into the cellar or pit.

Heating Pipes.

The four-inch cast-iron pipe for heating greenhouses has been almost entirely discarded and in its place wrought-iron gas pipe is used. Within the past few years small pipes from one to two inches in diameter for radiating surface have come into almost universal use in hot water heating, with one or more flow pipes large enough to supply many of the smaller radiating pipes. With the latter more radiating surface is obtained, the water circulates more rapidly, because the smaller the pipe the less water there is to heat. The pipes now used are practically of the same size as those used for steam, and the system of arrangement is very similar.

Arrangement of the Pipes. — To obtain the best results the pipes should be placed at nearly equal intervals through the house (Figs. 2, 3 and 4) and not in large coils or stacks. Most of them should be above the benches, especially for those plants whose roots are liable to injury by too much heat and moisture like the carnation, etc. Plants much subject to leaf diseases should have some of the pipes under the benches, as should also cutting benches and seed beds where the root growth is to be encouraged. Two methods of arrangement are most in use, Fig. 15, where the heated water rises to the highest point at once and falls continuously to the boiler, and Fig. 16, where the pipes continue to rise from the boiler to the farthest end of the house and then fall by a regular grade to the boiler. Both of these give good results, but in neither case should the pipes go below the grade and rise again to above the last level. The amount of pipe required will depend upon location, construction and the kind of crop to be grown, the quantity varying from one foot of heating surface of pipe to three feet of glass surface, to one foot to ten feet of glass surface.

In all cases the diameter and the heating surface of pipe should be larger than would be required to keep up the required heat when the heating plant is run at its fullest capacity, for it is not economy to force the boiler to its utmost. Two boilers are often put in, so that one only may be run during the fall and spring, and both together during the winter when needed, and that in case of the breakdown of one the other one can do the work while repairing is being done.

Ventilating Fixtures.

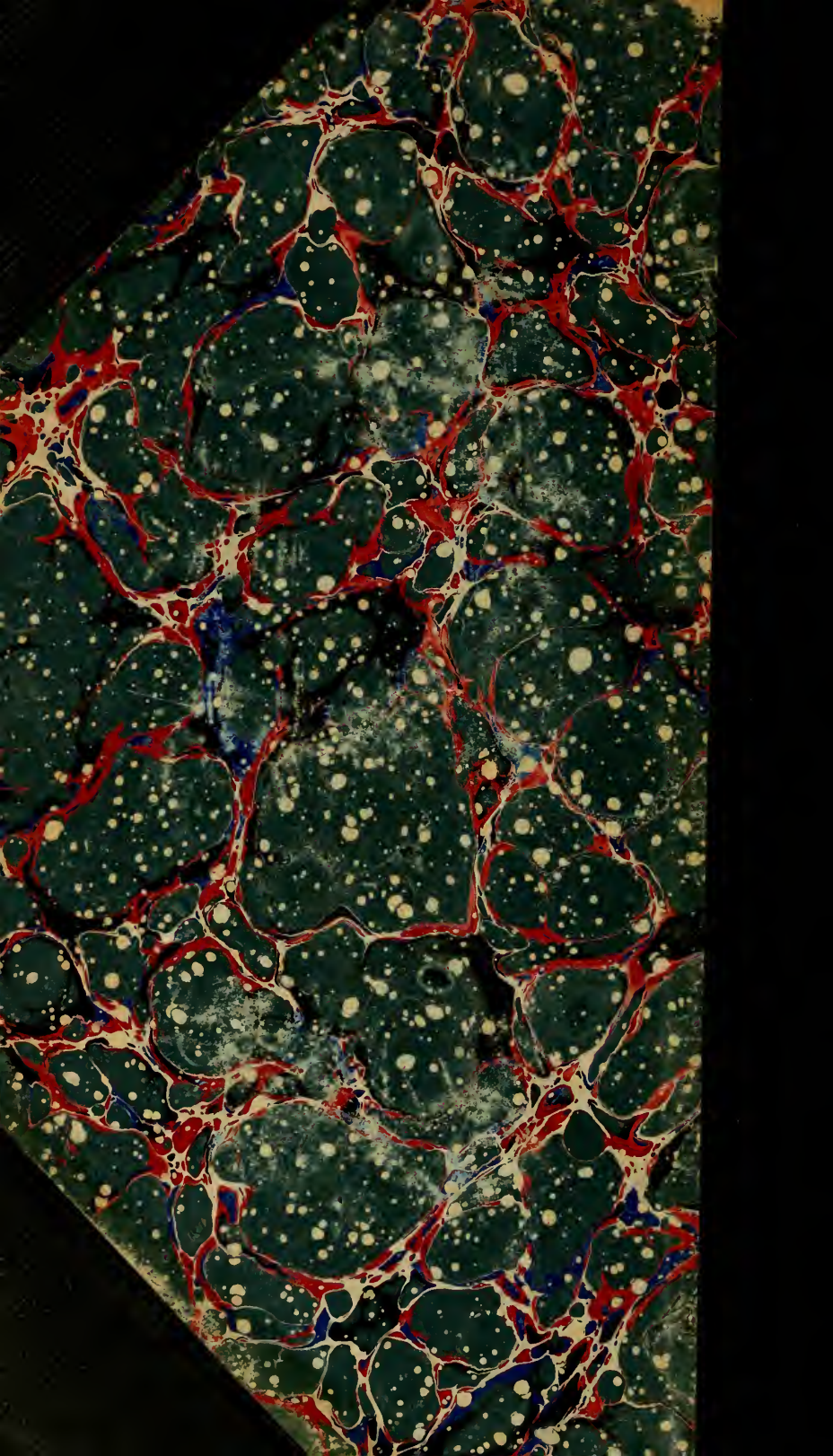
Of the many ventilator "lifters" in use, those that apply the force by means of a light shaft directly against the lifting end of the sash are perhaps the best. Some of this type are very expensive, while many are low in price. The lifters that work with the shaft and elbow joint are largely in use, but greater force is required with them than with the first-mentioned types.

Beds *v.* Benches.

Of the two methods in use in growing plants, *i.e.*, the bench (Fig. 3) and the bed (Fig. 4), each has its advantage with some kinds of plants. The bed is the more easily constructed but must be thoroughly drained, and more care is needed to keep the soil from getting into an unhealthful condition, and if it once becomes too wet it takes a long time to get it into a healthful condition again. With the bench, a small amount of soil only being used, the soil can be freely watered and it will drain and dry out quickly, and while the small body of soil that is used does not allow of a large supply of plant food, this can be supplied in a concentrated form and the bench thus be made to give rather more certain results than the bed, especially when cared for by unskilled help.

In the care of plants under glass the aim should be to give them exactly the conditions under which they best thrive out of doors, — a rich, fresh soil, an abundance of water, yet not so much as to cause the soil to become sour and stagnant, and plenty of sunlight and air. Close attention must be given to the temperature by night and by day, the night temperature always being several degrees lower than that of the day time. If this is reversed, or if the temperature runs high after a long spell of cloudy weather, many plants become sickly and unprofitable.

Insects.

As with crops out of doors, constant attention is required to prevent injury from insect pests. The rule in regard to this matter should be to destroy the first insect that appears and not wait until they become myriads, as they are sure to do if not promptly treated.

The soil, the amount of fertilizer to be used, the temperature required, the time and quantity of water to be used in the growth of flower and vegetable plants are questions the details of which require too extended discussion for the limits of this article, and the reader is referred to the numerous books on the subject and to the many successful growers who may be found in almost every section of the State.